# JOURNAL
*of the*
# American Veterinary Medical Association
*Formerly* AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

H. Preston Hoskins, Secretary-Editor, 221 N. LaSalle St., Chicago, Ill.





**Vol. LXXXVIII, N. S. Vol. 41 FEBRUARY, 1936 No. 2**


## NEW VACCINES AGAINST HOG CHOLERA

In the report of the Chief of the Bureau of Animal Industry for the year ended June 30, 1935, in the section devoted to the activities of the Biochemic Division, were included a few short paragraphs devoted to investigations of hog cholera. About a half-page was used to give very condensed reports of some experiments with several vaccines prepared as immunizing agents against hog cholera. It would be impossible to predict the far-reaching possibilities of one of these vaccines if further tests should demonstrate its efficacy under field conditions. It would be no exaggeration to say that present methods of attempting to control the disease would be thrown into the discard, by reason of being cumbersome, unscientific, and relatively expensive.

We refer to the serum-virus method of immunization as being cumbersome because it is exactly that. Two delicate biological products are required, one of which is bulky as biologics go. Separate syringes are necessary for their injection, and carefully graduated doses of serum must be given for best results. We say unscientific because the method involves the use of the active agent of the disease that we are trying to prevent. We say rela-

tively expensive because the probabilities are that a vaccine, if one is found that will do the work, can be produced at a cost much below that of a dose of serum and virus.

Ever since it was demonstrated that a filtrable virus is the cause of hog cholera, efforts have been put forth to develop a vaccine against the disease. Experiments along the same line had been conducted with the old *B. cholerae suis* (*Salmonella suipestifer*) while that organism enjoyed the questionable distinction of being the true etiological agent of hog cholera. Tissue vaccines of various sorts have been tried, following the leads of similar vaccines used in prophylactic vaccination against other infections. None of these ever showed any great degree of promise. Either the virus in the vaccine was not killed or sufficiently attenuated and the new product produced the disease, or the virus was so altered that it lacked the power to produce immunity.

In the recent experiments reported by the Bureau of Animal Industry, various chemical agents were used to attenuate the hog cholera virus. As the tests progressed, the field was narrowed down to three substances which showed the greatest promise: glycerin, phenol and crystal violet. These agents were mixed with defibrinated blood virus and stored at different temperatures and for various periods of time, until the mixture no longer had the power to reproduce hog cholera when injected into pigs susceptible to the disease. The next step was to inject the innocuous mixture into normal, susceptible pigs. Then, after waiting a sufficient time for the development of immunity, the pigs were exposed to cholera by injecting them with virus.

Based on tests in which 88 pigs were used, the crystal violet vaccine appeared to give satisfactory immunity to all but one pig. This is a satisfactory showing in 98.8 per cent of the pigs vaccinated, as against 86 per cent with the phenol vaccine and 76 per cent with the glycerin vaccine. An interval of from two to three weeks was found to be necessary for the establishment of immunity following the injection of the several vaccines.

On account of the promise shown by these preliminary experiments with the crystal-violet vaccine, steps have been taken to obtain a patent covering the process of producing it. In the event that a patent is granted, this will be dedicated to the public, as has been done with other products worked out by the Bureau of Animal Industry.

Much further experimentation remains to be done with the new vaccine, which had its inception in the mind of the late Dr. Marion Dorset, whose coworkers have been carrying on the tests

since his death the past summer. One very important point involves the keeping qualities of the vaccine, not only in the laboratory under carefully controlled conditions but incidental to the vaccine becoming an article of commerce and being subjected to the various vicissitudes of transportation, storage and field use.

The very fact that a rather long interval is required for the development of active immunity following the administration of the vaccine suggests that the new agent will have little or no use in infected herds, or even in herds exposed to hog cholera. Although there is a remote possibility that the vaccine might be used in conjunction with anti-hog cholera serum, there does not appear to be a great deal of promise in this direction. We are already painfully aware of the disastrous results which sometimes follow the use of serum and a virus of low virulence.

With all of its disadvantages, anti-hog cholera serum, in conjunction with virus, stands out as the most extensively used biological product today. More than that, in competent hands and when intelligently used, it is just about 100 per cent efficient in doing what is claimed for it. Until exhaustive tests prove the value of any new vaccine, the time-tried "double treatment" will remain as the sheet-anchor of veterinarians in their efforts to hold down losses from hog cholera.

## A MOVE IN THE RIGHT DIRECTION

When General Patterson was made Surgeon General in 1930, he changed the existing order of things and made the Veterinary Service of the Army a subdivision of the Professional Service Division of the Surgeon General's Office. This action placed the Veterinary Service in rather a subordinate position.

Fortunately, General Reynolds, the new Surgeon General, has the breadth of vision to recognize the fact that the medical professions comprising the various Corps making up the Medical Department of the Army have their own professional standards and problems that are peculiar to each service and that they should be in charge of their own officers under the supervision of the Surgeon General, as Chief, who represents all the Corps comprising the Medical Department.

Accordingly, Surgeon General Reynolds issued an order, under date of November 29, 1935, discontinuing the Veterinary Service as a subdivision of the Professional Service Division. In the future the Veterinary Service will function as the Veterinary Division of the Surgeon General's Office.

## TUBERCULOSIS RUNS TRUE TO FORM

The insidious character of bovine tuberculosis has been vividly demonstrated in the herd of dairy cattle belonging to the government and maintained at Beltsville, Maryland. When the herd of 378 animals was subjected to a tuberculin test on January 16, 1936, there were 82 positive reactions and eleven that were classified as suspicious, according to an announcement from Washington. When the herd was tested in October, 1935, one reactor was disclosed. In July, a test of the herd revealed three reactors. In April, all cattle were apparently free of the disease, although one animal was regarded as "suspicious."

For the last 18 years, the herd has enjoyed an accredited status. During the past seven years, only a few cattle have been introduced into the herd from outside sources and in all such cases the cattle have come from accredited herds. During this time the herd has been maintained almost entirely by replacements raised on the farm. All employés who have handled the cattle undergo periodic medical examination and none have been found to be affected with tuberculosis.

There are 25 bulls in the herd but there have been no reactors among these animals. The 378 cattle have been stabled in eight different buildings, and it would appear that only the animals in the bull barn have escaped infection.

On January 25, it was reported that 31 of the reactors and suspects had been slaughtered and that all but six had shown lesions of tuberculosis. Practically all lesions found were located in the cervical glands and the thoracic cavity, and none were extensive. The remaining reactors and suspects have been segregated and are being watched very carefully until they can be slaughtered.

It will be interesting to read further reports of the investigations which are being conducted for the purpose of finding out, if possible, how the infection got into the herd. It has been suggested that a particularly virulent strain of *Mycobacterium tuberculosis* (*bovis*) has gained access to the herd, possibly through either the feed or the water. No matter what the investigations disclose, the fact remains that within a period of about three months, following the removal of a single reactor, a considerable number of animals in the herd developed the disease to a point where they reacted to the tuberculin test.

Was the reactor removed at the October test a spreader? Or what about the three reactors found in July? Or that suspect, in April? Could anybody want a better illustration of the in-

sidiousness of the disease, or a better reason for continuing to test supposedly clean herds at regular intervals?

*Eternal vigilance is the price of liberty.*

## CONVENTION DATES

After due consideration of the recommendations of Columbus members, the Executive Board of the A. V. M. A. has fixed the dates of the 1936 convention for August 11-12-13-14. The meeting will open on Tuesday and continue through Friday, the last day to be devoted to a clinic, as has been the custom for a number of years. As usual, local conditions had a lot to do with the selection of the dates. It was necessary to steer clear of the Ohio State Fair for one thing. The convention this year will be held slightly earlier than most recent meetings, although at least twice during the last twelve years we have met earlier. The Portland convention was held July 21-24, and the Minneapolis meeting dates were August 7 to 10. The weather? Well, we gamble with that wherever we go as long as our meetings are held during the summer.

## DOCTOR ALLEN TO THE EXECUTIVE BOARD

Dr. L. J. Allen, of Oklahoma City, Okla., has been elected to the Executive Board of the A. V. M. A., to represent District 8 (Kansas, Missouri, Oklahoma, Arkansas, Texas and Louisiana), for the balance of the unexpired term of Dr. J. C. Flynn, in the special election which came to a close the past month. Dr. Allen will serve until the close of the annual convention in August. Regular elections will be held in Executive Board Districts 6 and 8 this year.

## APPLICATIONS FOR MEMBERSHIP

(See January, 1936, JOURNAL)

FIRST LISTING

ALLEN, CLIFFORD L. 2474 Summer Ave., Memphis, Tenn.
D. V. S., Kansas City Veterinary College, 1909
Vouchers: John H. Gillmann and J. C. Flynn.

BARNES, CHARLES Yazoo City, Miss.
D. V. M., Ohio State University, 1934
Vouchers: Wm. L. Gates and Edwin J. Frick.

BOOTH, ROBERT L. Middleburg, Va.
A. B., Swarthmore College, 1930
V. M. D., University of Pennsylvania, 1935
Vouchers: E. L. Stubbs and M. A. Emmerson.

CARTER, H. H. 3937 Summer Ave., Memphis, Tenn.
B. S., Mississippi A. & M. College, 1915
D. V. M., Kansas City Veterinary College, 1918
Vouchers: John H. Gillmann and J. C. Flynn.

CHILDS, JOHN W. 1475 Bridge St., Oroville, Calif.
D. V. M., Colorado State College, 1928
Vouchers: W. L. Curtis and Harvey W. Campbell.

COALE, BRADBURY B. Union Stock Yards, Los Angeles, Calif.
D. V. M., Kansas State College, 1934
Vouchers: L. M. Hurt and H. W. Graybill.

DE RING, JOHN S. Box 223, Tampa, Fla.
D. V. M., Alabama Polytechnic Institute, 1934
Vouchers: T. H. Applewhite and B. N. Lauderdale.

DUCKWORTH, ANCEL L. Greenville, Tenn.
D. V. M., University of Georgia, 1932
Vouchers: John H. Gillmann and J. C. Flynn.

DUCKWORTH, JAMES V. Picayune, Miss.
D. V. M., Alabama Polytechnic Institute, 1923
Vouchers: Wm. L. Gates and R. H. Stewart.

FINLEY, U. Z. Sage, Ark.
D. V. M., Arkansas Veterinary College, 1918
Vouchers: John H. Gillmann, J. C. Flynn and C. D. Stubbs.

GOEKJIAN, KEGHAM K. 3612 Lee Road, Shaker Heights, Ohio
D. V. M., Colorado State College, 1930
Vouchers: Clifford C. Wagner and N. L. Siplock.

HARBOUR, OTIS 188 W. McLemore, Memphis, Tenn.
D. V. M., Kansas City Veterinary College, 1917
Vouchers: John H. Gillmann and J. C. Flynn.

HART, CHARLES H. 138 King St., Saint Paul, Minn.
M. D. C., Chicago Veterinary College, 1911
Vouchers: F. W. Crawford and L. S. Smith.

LOCKHART, PAUL C. 957 N. Fairfax Ave., Los Angeles, Calif.
D. V. M., McKillip Veterinary College, 1920
Vouchers: J. K. Perry and W. L. Curtis.

LOTT, BRYAN F. Gresham, Neb.
D. V. M., Iowa State College, 1931
Vouchers: Frank Breed and Carl J. Norden.

NOONAN, HENRY P. 488 E. Tallmadge Ave., Akron, Ohio
D. V. M., Cornell University, 1919
Vouchers: W. F. Guard and Leonard W. Goss.

PARKER, WESLEY D. 2619 E St., Omaha, Neb.
D. V. M., McKillip Veterinary College, 1918
Vouchers: J. H. Cock and G. E. Whipple.

PASS, ALBIN G. Box 502, Owenton, Ky.
D. V. M., Alabama Polytechnic Institute, 1935
Vouchers: I. S. McAdory and F. D. Patterson, Jr.

PAXTON, CAPT. JOHN D. Box 723, Sacramento, Calif.
D. V. S., Colorado State College, 1912
Vouchers: W. L. Curtis and R. B. Griffenhagen.

PEARL, MARTIN D. 1122 W. Somerville Ave., Philadelphia, Pa.
V. M. D., University of Pennsylvania, 1934
Vouchers: Frank E. Lentz and G. A. Dick.

PERELLA, DORWIN H. 97 West St., Johnson City, N. Y.
D. V. M., Cornell University, 1934
Vouchers: H. J. Milks and W. A. Hagan.

POTTER, GEORGE M. 97 Rackleff St., Portland, Me.
D. V. M., Ohio State University, 1906
Vouchers: J. R. Corliss and W. C. Dendinger.

SAMPLE, FRED M. 204 E. Front St., Tyler, Texas
D. V. M., Colorado State College, 1935
Vouchers: I. E. Newsom and Geo. H. Glover.

SCHAEFER, H. R. 1251 Tutwiler, Memphis, Tenn.
M. D. C., Chicago Veterinary College, 1909
Vouchers: John H. Gillmann and J. W. Scheibler.

SIMPKINS, EARL J. 807 10th St., Marysville, Calif.
B. S., D. V. M., State College of Washington, 1930
Vouchers: Joseph M. Arburua and W. L. Curtis.

SMITH, LOUIS H. Lebo, Kan.
D. V. M., Kansas State College, 1928
Vouchers: Chas. W. Bower and E. E. Leasure.

SNODDERLY, WILLIAM J. Pierce, Colo.
D. V. M., Colorado State College, 1933
Vouchers: G. E. Melody and C. H. Hays.

STEWART, DALE B. 1442 Hawley Ave., South Saint Paul, Minn.
D. V. M., Ohio State University, 1910
Vouchers: F. W. Crawford and John R. Scott.

YATES, VIVIAN W. Ripley, Tenn.
D. V. M., Chicago Veterinary College, 1918
Vouchers: John H. Gillmann and J. C. Flynn.

## Applications Pending

SECOND LISTING

(See January, 1936, JOURNAL)

Backus, Newell D., 345 W. 2nd St., Elyria, Ohio.
Einerson, John O., Lakota, N. Dak.
Evans, Lewis W., La Porte, Ind.
Franklin, Hugh L., Greeley, Colo.
Hasson, David S., 3026 Main St., Kansas City, Mo.
Hyde, David C., 1700 Arlington Ave., Columbus, Ohio.
James, George W., 7521 Harrisburg Blvd., Houston, Texas.
Link, Roger P., Kansas State College, Manhattan, Kan.
Toroian, Mark H., 11 E. Nelson St., Lexington, Va.
Wiseman, Lt. Edwin S., Post Office Bldg., Baltimore, Md.
Wishard, Dell E., 1612 E. Alabama St., Houston, Texas.

The amount which should accompany an application filed this month is $9.58, which covers membership fee and dues to January 1, 1937, including subscription to the JOURNAL.

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## COMING VETERINARY MEETINGS

Connecticut Veterinary Medical Association. Hartford, Conn. February 5, 1936. Dr. Edwin Laitinen, Secretary, 993 N. Main St., West Hartford, Conn.

New York City, Veterinary Medical Association of. Hotel New Yorker, 8th Ave. and 34th St., New York, N. Y. February 5, 1936. Dr. R. S. MacKellar, Jr., Secretary, 329 W. 12th St., New York, N. Y.

Saint Louis District Veterinary Medical Association. Melbourne Hotel, Saint Louis, Mo. February 5, 1936. Dr. Milton R. Fisher, Secretary, 4405 W. Pine St., Saint Louis, Mo.

Illinois State Veterinary Medical Association. Palmer House, Chicago, Ill. February 5-7, 1936. Dr. C. C. Hastings, Secretary, Williamsville, Ill.

Ontario Veterinary Association. Royal York Hotel, Toronto, Ont. February 6-7, 1936. Dr. H. M. LeGard, Secretary, 335 N. Main St., Weston, Ont.

Chicago Veterinary Medical Association. Palmer House, Chicago, Ill. February 11, 1936. Dr. O. Norling-Christensen, Secretary, 1904 W. North Ave., Chicago, Ill.

San Diego County Veterinary Medical Association. San Diego, Calif. February 11, 1936. Dr. L. K. Knighton, Secretary, 3438 Mountain View Drive, San Diego, Calif.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. February 11, 1936. Dr. F. D. Egan, Secretary, 17422 Woodward Ave., Detroit, Mich.

Hudson Valley Veterinary Medical Society. Albany, N. Y. February 12, 1936. Dr. J. G. Wills, Secretary, Box 751, Albany, N. Y.

Alabama Veterinary Medical Association and Short Course for Graduate Veterinarians. College of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala. February 17-22, 1936. Dr. I. S. McAdory, Acting Dean, Alabama Polytechnic Institute, Auburn, Ala.

Kansas City Veterinary Association. Baltimore Hotel, Kansas City, Mo. February 18, 1936. Dr. C. C. Foulk, Secretary, 1103 E. 47th St., Kansas City, Mo.

Southern California Veterinary Medical Association. Chamber of Commerce Building, Los Angeles, Calif. February 19, 1936. Dr. L. E. Pike, Secretary, 1220 Bennett Ave., Long Beach, Calif.

North Carolina State Veterinary Medical Association. Hotel Sir Walter, Raleigh, N. C. February 21, 1936. Dr. J. H. Brown, Secretary, Tarboro, N. C.

Keystone Veterinary Medical Association. Philadelphia, Pa. February 26, 1936. Dr. J. A. Mehan, Corresponding Secretary, 39th St. & Woodland Ave., Philadelphia, Pa.

Massachusetts Veterinary Association. Hotel Westminster, Boston, Mass. February 26, 1936. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

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# UNIFORM MEAT INSPECTION*

*By* OSCAR G. MAYER, *Chicago, Ill.*
*Institute of American Meat Packers*

For more than 25 years, the American public has enjoyed the benefit of a progressively improved system of federal meat inspection. Conducted under the supervision of that eminent veterinarian and administrator, Dr. John R. Mohler, and his associates, our system of federal meat inspection is recognized throughout the world as being second to none.

It is estimated that approximately two-thirds of our annual meat supply is inspected under the federal regulations and given the guarantee of the United States government that the meat is wholesome and entirely fit for human consumption. The American people are scarcely aware of the federal meat inspection system, so efficiently and unostentatiously is it administered. But, as with many things which we enjoy without realizing that we are enjoying them, a great outcry undoubtedly would arise if federal meat inspection were to be abolished.

Yet today, a vast quantity of meat, about six billion pounds annually, or one pound of meat in every three purchased by American housewives, does not have the benefit of that inspection. It creates the ironic situation under which, in many instances, a state delivers better meat to its neighbors, by virtue of the federal meat inspection law, than it serves to its own citizens. This also applies to our foreign customers, all of whom enjoy the benefits of our federal inspection service.

Now, I hasten to say that I do not wish to convey the impression that state, municipal, or local inspection does not exist, or that if it does exist, it is valueless. A number of states have creditable regulations concerning inspection and processing, but too often they are not administered effectively through lack of funds, inspectors, or for other reasons. Some states have extraordinary regulations concerning the manufacturing of sausages and the use of coloring materials that are more rigid than the federal standards, but no, or very inadequate, inspection laws controlling the slaughter of the animals from which they are made. In general, the standards differ so widely and in most instances so little attention is paid to the paramount question of *postmortem inspection at the time of slaughter* that, in my opinion, the public has inadequate guarantees in this respect.

*Presented at the seventy-second annual meeting of the American Veterinary Medical Association, Oklahoma City, Okla., August 27-30, 1935.

One or two states, like California, have adequate laws, based on the federal statute, which are being enforced, and additional states, I understand, are considering the adoption of more effective laws than those existing.

What seems to me to be the worst feature of the situation and the one that is certainly disturbing from every viewpoint, is that animals whose appearance indicates to the owner that they would not qualify for slaughter in plants having proper inspection, tend to gravitate to those houses in which inspection is more lax or lacking. I maintain that if meat is deemed, by a sound standard of inspection, to be inedible at one point, it should be inedible at all other points. The situation might be different if all the animals of a state could be freed of disease, than if all bacteria could be halted at the state line through a disease embargo proclamation by the governor. I might say that so far this proposal has been scoffed at.

## Origin of Move in Packing Industry Toward Uniform Inspection

The subject of adequate inspection has been before the meat-packing industry for many years. The first official step taken was the adoption of a motion by the Executive Committee of the Institute of American Meat Packers in September, 1929, that a resolution be introduced at the next convention of the Institute authorizing the appointment of a commission "to work out and execute plans for achieving a uniform state inspection law."

The next step was the adoption, by the 1929 annual convention of the Institute, without a dissenting vote, of the following resolution:

> Whereas, It is equitable and fair that the public interest be adequately conserved and that all packers be subject to such regulations as are reasonable and fair, whether state or federal, and
>
> Whereas, Possibility of conflict exists between federal and state inspection laws or regulations, therefore, be it now
>
> Resolved, That the members of the Institute of American Meat Packers, in convention assembled, declare that a uniform and adequate state inspection law to be enforced by the state and federal governments in coöperation is desirable; that they will support the passage in their respective states of such a law, and to the end of effecting it they expressly authorize the president of the Institute of American Meat Packers, in consultation with the chairman of the Board of the Institute, to appoint a committee, including non-federally inspected packers, to draft an appropriate measure and to work out and follow up plans for its passage in the different states.

## Federal Aid for Inspection

The Commission on Inspection, which was appointed in fulfillment of the resolution just read, considered carefully various

methods of achieving uniform inspection. After many long discussions, the members of the Commission agreed that some central, coördinating authority was essential if uniform inspection was to be achieved. A suggestion was contained in that part of the resolution adopted by the Institute's convention which referred to a "state inspection law to be enforced by the state and federal government in coöperation." Precedents for coöperation between the federal and state governments had been established in the case of the Federal Road Act and in the case of coöperative tuberculosis eradication work, in which the federal government had extended financial aid to states, as well as in other instances.

It thus appeared that an opportunity existed in the form of federal aid for providing an instrument by which uniform state inspection could be achieved. Consequently, the Institute's Commission on Inspection prepared a bill which would authorize federal aid to states in establishing a system of uniform meat inspection and also drafted the companion measure, a uniform inspection bill, which would provide necessary machinery within each state to enable the state to take advantage of the federal aid.

The proposed federal bill was designated as the Federal Aid Meat Inspection Act. It would authorize the federal government to offer any state a sum equivalent to half the cost of inspection, provided the state adopted and maintained a system of inspection that met with the approval of the Secretary of Agriculture; in other words, no state would receive aid under the law unless it had a department that, in the opinion of the Secretary of Agriculture, would be adequate to perform the functions expected of it.

Among other proposals contemplated by the Federal Aid Meat Inspection Act may be mentioned the following:

Inspection would be made by inspectors appointed by appropriate officials of the state and removable by such officials for incompetency, or failure, or refusal to perform their duties efficiently.

If a state failed to maintain an inspection system up to the standard, the Secretary of Agriculture would have power to withdraw the federal aid.

In such a case, the state would have to bear the entire expense of inspection, or would have to lower its inspection requirements. The latter alternative probably could be controlled by the issuance of publicity, pointing out the menace to public health which is associated with improper inspection.

## Proposed Uniform State Inspection Act

The Commission on Inspection also drafted a proposed uniform state inspection law. It is modeled closely after the federal Meat Inspection Act, which, as you know, has been successfully administered for almost 30 years. The uniform state inspection law is designed to set up machinery which would enable states to take advantage of the federal aid made possible by the Federal Aid Meat Inspection Act.

A feature of the proposed bills is that they provide *no exemptions whatever* in the case of meat offered for sale. The Commission felt strongly that if the necessity exists for inspection of two-thirds of our meat supply, an equal necessity exists for inspecting all of the supply which is offered for sale. If a home slaughterer wishes to take a chance of eating unfit meat or of making it available to his family, that, we felt, would be hard to prevent, but he should not be permitted to sell unfit meat, or potentially unfit meat, to others.

The Commission recognized that the lack of exemption of farmers offering meat for sale would arouse opposition to the bills, but we felt that a principle was at stake and that we should not subordinate principle to political expediency.

## Municipal Inspection

Some friends of adequate inspection have suggested that instead of trying to bring about a system of uniform inspection throughout the states, which admittedly will be a task of some magnitude and a task requiring much time, it might be easier and more effective to accomplish the same objective by coöperating in the development of municipal inspection in the larger cities of the country.

It has been our feeling that the development of municipal inspection would be most helpful and is a progressive step which should be encouraged. We do not feel, however, that it will solve the problem which confronts us and we think that it might even complicate matters by setting up many different standards of inspection, none of which would be under the supervisory control of any central authority.

However, if a municipality wants to go in for inspection, we see no reason why it should not adopt and enforce the ***uniform inspection code*** proposed by the Commission. We are inclined to believe that such action would develop a strong sentiment for and hasten the adoption of the uniform code by the state. We feel sure that the ultimate working unit must be the state itself.

In developing its proposed plan for a system of uniform inspection, our Commission on Inspection has endeavored to be careful at every point to protect the rights of all packers and the rights of the states.

It is the feeling of the Commission that a liberal policy should be recommended in connection with the initiation of uniform inspection. One suggestion made, which met with considerable approval among the members of the Commission, was that a transition period of several years might be permitted, during which plants not now operating under adequate inspection could be brought up to the uniform standard.

The Commission also recommended, as a statement of principle, that, although uniformity would be desirable, the standards of inspection and sanitation provided for in any federal law looking toward uniform meat inspection should be considered as minimum standards and that they should put no limit on any standards which any state may wish to establish above the standards provided for in the federal act.

### Probable Cost of Uniform Inspection

It now costs annually about six million dollars for the federal government to inspect two-thirds of the meat supply of the country. We figure that it might eventually cost eight million dollars to inspect the remaining one-third of the entire supply of the country; this because the plants inspected under a state inspection would be smaller individually and more widely scattered.

But even if it should eventually cost eight million dollars, in addition to the sum now being expended, the federal government under this plan would be called upon for only one-half the expense—four million dollars—the other one-half being borne by the 48 different states. Surely this is a small price to bring to the country a meat supply that would be one hundred per cent wholesome. We feel, moreover, that it would take several years before the full adherence of the states could be obtained.

### Benefits to Industry and Individual

It is only natural that everyone who would be affected by uniform state inspection should consider whether such inspection would be to his advantage or disadvantage. It seems to me that, as far as the progressive packer is concerned, there is but one answer.

Uniform state inspection, properly administered and enforced, undoubtedly not only would result in the elimination of much unfair and unscrupulous competition, both for the federally in-

spected and the conscientious non-federally inspected packer, but would give meat and meat products an enviable distinction in the eyes of the consumer.

There can be no doubt that both of the results which I have mentioned would be generally beneficial, just as the public guarantee of milk pasteurization has greatly benefited the dairy industry.

Such benefits would not, by any means, be confined to packers now operating under federal inspection, but would accrue just as strongly to the many conscientious, progressive packers or meat manufacturers whose present standards of operation are close to the federal standards, and who suffer equally with federally inspected packers from the unfair competition of packers whose standards are not so high.

An added benefit to be derived from uniform state inspection would accrue to packers who, finding their business or their opportunity for business growing, want to enter into interstate commerce. It would make the change to federal inspection, which would be necessary under the federal law, a simple matter.

If this program is successful, as it promises to be, it will lead to the elimination from the table of the American consumer of all meat which may be unfit or in doubt.

This would be a truly great accomplishment, which would greatly increase the confidence, good will and esteem of the American public for the live stock and meat industry.

This would redound to the benefit of all branches of the industry, and unquestionably bring about an increase in meat consumption.

### Cooperation Will Be Necessary to Accomplish End

We are under no illusion as to the difficulties of accomplishing this program. We know the difficulties with which other groups promoting uniform state laws have met. There have been two developments, however, which lead me to believe that the accomplishment of this program is now within the realm of probability.

One is the apparent eagerness of the federal government to encourage worthy projects. Now, more than at any time previously, it seems to me that it might be possible without great difficulty to obtain the federal aid which this program contemplates.

The second favorable point is the great interest in the subject which is being shown by the American Veterinary Medical Association and its members. This is deeply gratifying to the Institute and its Commission on Inspection. We ask your active sup-

port. I am sure that with your vigorous support and that of other interested groups of the live stock and meat industry it will be possible to achieve a system of uniform meat inspection that will redound to the credit of the American Veterinary Medical Association and the American packing industry and the benefit of the American people.

## Station KSAC Speaking

Last year members of the staff of the Division of Veterinary Medicine at Kansas State College presented 37 radio talks from the college radio station KSAC. The station is on the air only 3½ hours each day, six days a week, but the total number of broadcasts for the year reached 4,353. The station operates on a frequency of 580 kilocycles.

## Grade A Milk for Chicago

Effective February 1, 1936, an ordinance adopted over a year previously provides that all milk delivered for consumption in Chicago, Illinois, shall be of a quality not lower than Grade A. Chicago is the largest city in the United States, or the entire world, for that matter, to require such a uniformly high standard for all milk sold in the city. Chicago already has a remarkably low infant mortality and it is believed that the new requirement for milk will contribute further toward the promotion of better health conditions in the Windy City.

## Is This a Record?

Farmer Eddie Brooks, near Greenville, Tenn., was inclined to credit publicity about the Dionne quintuplets with an event on his farm recently, when one of his cows gave birth to 47 calves. Only one calf, which was normal-sized, lived. The rest, which were about the size of rats, died.

## BUREAU TRANSFERS

Dr. Wm. G. Duncan (Colo. '32), from Englewood, Colo., to New York, N. Y., on meat inspection.

Dr. R. A. Goodman (Tex. '32), from New York, N. Y., to Alpine, Texas, on field investigation.

Dr. Thos. J. Muxlow (K. S. C. '30), from South Saint Paul, Minn., to Portal, N. Dak., on quarantine inspection.

Dr. F. C. Steinman (Tex. '29), from Pittsburgh, Pa., to Fort Worth, Texas, on meat inspection.

# ARTIFICIAL INSEMINATION*

*By* H. E. KINGMAN, *Cheyenne, Wyoming*
*Wyoming Hereford Ranch*

Artificial insemination is one of the problems that enters into the study of factors that have to do with reproduction. Sterility in the female and infertility in the male are parts of the same problem, in that, in order for reproduction to take place, favorable conditions must accompany the mating. This applies to both natural and artificial insemination. Things that influence one act in the same way upon the other, so that any information gained through the study of artificial insemination can be applied directly to problems relating to natural methods of reproduction. For example, in order to study the part taken by the male in reproduction, one begins with breeding record, physical examination, and semen examination. This should be done whether or not the semen is used for insemination, especially in those cases where the breeding record is not satisfactory. In order to know what is abnormal, one must first know the normal. In working with artificial insemination, one is given the opportunity to study, in detail, bulls of varying degrees of potency.

I have been given an unusual opportunity to study the problems of artificial insemination of the cow because of the fact in that, one herd with which I have to deal, each individual is identified by horn brand and with few exceptions is kept under constant observation. A complete history of the breeding record of about 1,500 cows is kept on cards that are filed according to number. The greatest single factor in the study of the whole problem is the enthusiastic support and coöperation of Mr. Robert Lazear. He must receive a great deal of credit for whatever progress has been made, because of his patient oversight of failures and his faith in the value of the work.

Many changes in routine and method have been made since the beginning of this work. It is of little interest to the most of you to follow the changes that have taken place and why. I think that the present method is a great improvement over the old, but I realize that additional experience will bring about still further changes in routine method and opinion. Some progress has been made but the results are far from satisfactory. The work is incomplete. In fact, a report should not be made at this time. I am persuaded to do so in hopes that criticism of the work will bring to light errors I have failed to see.

*Presented at the seventy-second annual meeting of the American Veterinary Medical Association, Oklahoma City, Okla., August 27-30, 1935.

Insufficient work has been done to determine the length of time sperms can be kept outside the body and still fertilize an ovum. How much may semen be diluted without detracting from its value? How harmful is sunlight? What temperatures are best for its preservation? What is the best time to introduce semen as far as the estrual period is concerned? Can the virility of an animal be changed through the use of hormones? What is the effect of numbers of sperms upon the success or failure of the insemination? What is the effect upon semen of fecal contamination? These are some of the questions that we, who are working on problems that are relative to reproduction, are trying to answer. Hasty conclusions should be avoided. An enormous amount of work will be necessary before we are in a position to make definite statements.

Insemination indicates the fertilization of an ovum. General usage, however, has made its meaning elastic, so that the placing of semen in such a position that the sperm can reach the ovum in insemination that may or may not be followed by fertilization. The terms fecundation, fertilization, and impregnation are used synonymously but insemination indicates only that semen has been introduced artificially into the genital tract.

Artificial insemination is common in plant propagation. Pollination is the term commonly used when dealing with plants and refers to fertilization of an ovum. In plant life nature has made provision for fertilization in many queer and intensely interesting ways. In some instances the life cycle of an insect is a component part of the fertilization of a flower. For example, the life cycle of the pernuba moth and the fertilization of the yucca plant. One might dwell upon many interesting examples of the part insects and men are playing in plant fertilization and breeding.

As far as I know, mammals are not dependent upon any intermediate method for conducting sperms from the male to the female. However, this does not mean that it cannot be done. In fact, it can be and is being done. Theoretically all that is necessary is to plant a healthy, normal, uninjured sperm within the cervix of a healthy female, in estrum and of the same species as the male. This should be true practically as well as theoretically. The trouble lies in the fact that sperms are easily injured and the factors that influence fertilization are many.

Failures, both artificially and naturally, are so frequent that a search for their causes becomes imperative. Every step in the procedure of artificial insemination of cows has been checked time after time.

## Material and Methods

All data relative to the breeding history of the cows and the bulls have been tabulated in such a way that a comparison of the individuals as well as groups can be made and analyzed.

The breeding records of all individuals are carefully studied. If the bull has failed repeatedly to "settle" his cows or if a cow fails to "settle" after repeated breeding, either or both are looked upon with suspicion. If artificial insemination fails in individuals with good records, then the fault lies with the method. This becomes more apparent when the first subsequent mating of the same individuals conducted in the natural way results in impregnation. Any test other than actual mating is subject to many errors. And further, the causes for failure in natural or artificial breeding have their origin in fields, many of which have not been explored. Therefore, opinions relative to failure of animals to reproduce must be expressed with caution. Whether artificial insemination of animals is easier to accomplish than natural breeding remains to be seen.

There are many reasons for investigating and endeavoring to develop a means of artificial insemination:

1. *The extension of usefulness of outstanding sires:* It is a well established fact that certain individuals in all species of animals stand out above the others. At the present time the Department of Agriculture is conducting an extensive survey in order to locate the most outstanding sires in the dairy breeds of cattle. From the standpoint of horses, such individuals as Justin Morgan, Hambletonian 10 and Gallant Fox are examples of great sires. Prince Domino 499619 is the progenitor of over a million dollars worth of Herefords. There are many instances where outstanding sires should be used to the fullest possible extent. Artificial insemination provides a means by which the usefulness of exceptionally good sires can be increased many fold.

2. *The relation of artificial insemination to the general subject of reproduction:* Artificial insemination forms a basis for the study of the subject of reproduction. One cannot approach the problem without a background of physiology, anatomy and pathology, relating to the male and female genital systems. Such a study should lead not only to the success of the method but also to the solution of many of the difficulties that are responsible for sterility in the female and infertility in the male.

3. *The protection of either individual from injuries common to service:* Artificial insemination offers a means of continuing the usefulness of individuals, both male and female, who, because

of some physical defect, are unable, or should not be allowed, to copulate. For example: physical exertion that might cause a fracture, differences in size, nervousness, lameness from diseases of the feet, and many other examples of unfitness for service.

4. *The transportation of semen:* Carrying semen over comparatively long distances makes possible the extension of the use of a sire.

## Methods of Collecting Semen

1. *Massage:* The most satisfactory way I have found for collecting semen is that described by Dr. F. W. Miller. The specimen obtained is freer from contamination and richer in sperms than by any other method. The bull is prepared by thoroughly washing the region around the opening of the sheath and removing all surplus tufts of hair. Then the area is dried with a towel. No disinfectant of any kind is used in the water for fear that some of it might reach the specimen of semen. It is possible that alcohol might be used safely but I have preferred to deal with the danger of contamination rather than to take the risk of killing the sperms.

Contamination of the specimen cannot be avoided altogether but it can be greatly reduced by vigorous washing with warm water. The sheath is a filthy region and specimens obtained under ordinary cleanliness are foul with manure and cellular débris. The anus is washed with soap and water and the gloved hand of the operator is well lubricated with soap. Usually the bladder has been voluntarily emptied during this preparation. An assistant stands ready to hold a test-tube and glass funnel beneath the opening when drops of fluid appear. I have worked alone at this job and have used a number of different ways of holding the tube in position. The test-tube may be introduced into the prepuce and held into position by a rubber band around the body. I also have a leather cone with a hole in the bottom to receive the tube and funnel and a strap over the back to hold it in place.

The instructions of Dr. Miller should be followed carefully in order to obtain the best results. The seminal vesicles are avoided and the ampullae are picked up at the neck of the bladder and carefully milked out. This is not altogether easy and on the other hand not so very difficult in any case I have encountered. I have not always succeeded in obtaining semen, but such cases are the exceptions and for some reason I fail repeatedly on the same individuals, while in other animals the method is always successful. Every precaution is taken to prevent contamination

and exposure to cold and sunlight. The specimen is immediately examined under the microscope, a record made of the findings, and a slide prepared for further study.

2. *Semen collected from the vagina:* There has been little effort made to avoid fecal contamination. I think this would be desirable and would lead to better results but in practice a thorough cleansing of the animal is difficult. Antiseptics must be avoided. However, I believe that a thorough washing with warm water should always precede the service. But I have usually been forced to accept a less efficient method. Artificial insemination can be conducted under far more cleanly conditions than natural copulation.

The semen is collected by means of a long syringe with a glass barrel and rubber plunger. Metal instruments should not be used in handling semen. The specimen is placed in a test-tube and carried for examination to a suitable place away from sunlight and undue exposure. Experience enables one to estimate the amount of semen in the collected specimen. However, it has been my practice to examine each specimen macroscopically and microscopically before using it. If it is to be kept for any length of time, it is examined again just before it is to be used.

3. *Rubber sack:* A rubber sack placed in the vagina has not proved satisfactory. In fact there were so many undesirable things encountered in the attempts to use it that it was discarded without a great deal of effort to overcome the disadvantages. It is difficult to introduce. Once in place in the genital tract it slides part way or all the way out before the bull has a chance to serve the cow. Any attempts to lubricate the inside of the tube render it more sticky rather than slippery. It soon becomes befouled with feces and hangs in such a position that the bull cannot possibly strike the opening intended for the penis. In the case of successful service, the semen is spread over the inside of the tube to such an extent that it is almost impossible to recover it.

4. *Artificial vagina:* I have not attempted to use the artificial vagina and therefore I do not care to comment upon its possible usefulness.

5. *Semen from the penis:* Small amounts of semen can be collected from the end of the penis following unsuccessful attempts at service. I have made such collections for the purpose of determining to what extent semen is actually wasted by such unsuccessful attempts. While a complete ejaculation is sometimes promoted by efforts to serve the cow, it is my opinion that comparatively few sperms are wasted by such efforts. In some

instances no sperms can be found in the fluid that drips from the sheath. Young bulls are more inclined than older animals to waste semen in this manner. It is seldom that enough semen may be collected in this manner.

## Semen Examination

1. *Macroscopic examination:* Semen consists of a semi-gelatinous fluid by which spermatozoa are conducted through the genital tract of the male. The viscosity and turbidity of the semen vary greatly in different species. Also the specimen varies from time to time in macroscopic as well as microscopic appearance. In the vas deferens it is a thin, light gray fluid, which, if dropped from a glass tube, forms a large globule. It is not viscid to the extent of being stringy. Obtained from the ampullae, it is very much the same as when found in the epididymis and vas deferens. According to Dr. F. W. Miller, the fluid from the seminal vesicles consists of a thin, nearly transparent secretion. The specimen of semen obtained from the vagina following copulation differs from the specimen obtained by massage, in that it is more viscid and more opaque. When mixed with mucus of estrum, it can easily be differentiated from the latter by its almost white color, as it floats in the perfectly transparent mucus.

2. *Microscopic examination:* Semen is examined microscopically for the purpose of determining:

(a) The approximate number of sperms per cubic millimeter.

(b) The number of sperms that are motile and the degree of activity.

(c) The kinds of cells that are present in the specimen other than sperms, such as epithelial cells, red and white blood cells, protoplasmic drops, and bacteria.

(d) The morphology of the sperm cells.

For microscopic examination, the specimen must be kept above 65° F. and it should be thinned with some diluent in order to permit greater freedom of motion on the part of the sperms. A large drop is placed on a slide and covered with a slip, The stage of the microscope and slide must be kept at about 80° F., away from drafts and sunlight. The best time to examine semen is immediately following copulation.

One first makes note of the number of sperms. For field purposes one makes a very rough estimate and the specimen is classified as having; many, few, or no sperms. When more accurate methods can be used, the specimen is diluted 10 or 100

times and placed upon a hemocytometer, the sperms counted and the total number calculated per cubic millimeter.

Nature has made provision for many failures in the sowing of seed. Examples are before us on every hand. Plants produce enough pollen to fertilize thousands of ova. Like the pollen of flowers, literally millions of sperms are produced in order that one may fertilize an ovum. I have made no effort to make accurate counts of the number of sperms in a specimen used for insemination, and I have not the slightest idea in regard to what part numbers play in the success of the operation. I have used as large a number as it was possible to obtain. The determination of facts relative to the importance of number will be a long, tedious and expensive process.

4. *Motility:* The sperm has two functions: a germinative, located in the head, and a motive. The motive power of the sperm probably lies in the middle-piece, although, as one watches it wiggle about, it seems as if the tail is principally responsible for its activity. One is also impressed by the versatile movements of the sperm. It advances in a straight direction or circles to right or left. It can revolve upon its longitudinal axis. As it turns the flat side horizontally, the light passes through and it appears silvery, but when it turns the very thin edges toward the observer, the head is seen as a short, pointed, black line, just about the width of the middle-piece. In a favorable medium the sperms twist, spiral and flash across the field. Each one dashes madly about in search of an ovum, but not in any instinctive or directed manner. The movement appears to be an unintelligible scramble, success depending upon numbers and luck, that one of them will take the right direction and persist until it reaches the Fallopian tube. There is no other explanation. There is no suction, no ciliated motion or nervous influence to attract the sperm in the right direction. In fact, gravity exerts a backward flow that favors the escape of the semen. It is a long, tortuous road for such a minute organism to travel. When it finally reaches the narrow Fallopian tube, it is met by the adverse wave of ciliated epithelium. It requires an active, healthy sperm to reach its intended destination.

Motility is an essential prerequisite for fertilization. Without vigorous and sustained motility a sperm cannot be given an opportunity to meet an ovum, no matter how perfect the sperm may be in other respects. It must be kept in mind, however, that motility is only one factor and that sometimes very motile sperms are incapable of fertilizing. It has been pointed out by many investigators that one must not place too much weight

upon the significance of motility. Only by taking into consideration all of the factors is one able to estimate the quality of motility. A sperm must be straight from head to tip of tail in order to advance through mucus and across irregular surfaces of the genital mucous membrane.

Motility probably plays some part in the progress made by sperms through the genital tract, but it is mostly dependent upon fluid mucus as a vehicle, and the ejaculatory efforts of the urethra. In the female genital tract the tenacious semen of the bull is diluted by the thin mucus of estrum. This permits the sperm to escape from the thick mass of male semen into the glary estrual fluid and to gain greater freedom of motion. Whether or not the mucus of estrum stimulates motion through some property (chemical or physical) is not known, but at least the sperms are decidedly more active, at least for a time, than when found in other locations. Motility may be affected by the shape of the tail but in many instances I have seen sperms with curved and crooked tails jerking vigorously without making progress in any direction. Sperms with curved tails go around in circles. When the tail is wrapped around itself, like a whiplash, the sperm moves in a spasmodic fashion but remains in one location.

Dr. Carl Moore, while working with the problem of sperm motility, makes the following observation:

> We are still endeavoring to throw light on the problem of germ cell life, particularly the period of metamorphosis from the spermatid to the fertilization of the ovum. What the unshed sperms are doing, to what influences they are subjected, how rapidly they are formed, how long their life, what of their disposition or fate in the absence of mating, and what of their vicissitudes when transferred into the female upon mating include questions, many of which the solution has scarcely begun.

The rate at which sperms are produced becomes an economic factor in animals that are used for breeding purposes, since in many instances they are taxed to the limit. As far as known, neither macroscopic nor microscopic pathologic changes take place in the testes as a result of frequent service. The effect of storing sperms in the epididymis is also interesting. If age influences virility (ability to fecundate), then a second or even a third service might draw a fresher and more virile supply of sperms. There is some clinical evidence to support this theory, and a study of motility of sperms upon first and second services also indicates an increase in the latter.

Moore also calls attention to the fact that sperms live longer in the epididymis when under the influence of male hormone,

than when it is absent. Three years ago, while working upon the problem of infertility in the male, I tried to determine the effect of male hormones upon fertility, but the failure to find the hormone in bull urine stood squarely in the way of progress.

It is not necessary at this period to give the data relative to the work that has been done in order to determine the factors that affect semen outside the body. In order to draw conclusions relative to the influence of time outside the body it is first necessary to establish a method of insemination that is perfect enough to be called a "control." At the present time, no such method exists. Motility is not an accurate index to potency of semen. The impregnation of a female is the only true test. This has not been perfected to a degree that will permit its use as a control method, in the investigation of the influence upon semen, of time, light, and many other factors.

I have used semen of varying ages from one to 24 hours, and at temperatures varying from that of the body to 40° F. Usually when the specimen was kept longer than a few minutes, the temperature was lowered to 70 or 75° F. Some work has been done in an effort to determine the limit of temperature to which semen may be lowered and still be revived. Work along this line requires time and a large number of trials at insemination.

It has been my experience that motility of sperms subsides rapidly with the age of the specimen and further that the temperature at which it is kept exerts a marked influence. Observations were not made upon specimens that were kept above body temperature. Placing semen upon ice caused an immediate inhibitory effect upon the sperms and when allowed to remain upon ice for six hours or more the sperms were all non-motile and could not be revived. In another specimen, however, in which the semen was allowed to freeze, sperms were restored to life at the end of twelve hours. These contradictory experiences are not easy to explain.

### Morphology of Sperms

Dr. Fred McKenzie and others have studied the influence of sperm morphology upon fertility. The former believes that semen that contains more than 14 per cent of what he terms abnormal sperms will be found to be impotent.

Williams, Savage and Williams, working on the significance of variability in head-lengths, concluded that a coefficient of variability in excess of 4 was indicative of impotency.

I have studied the significance of morphology of sperms by correlating the breeding record of bulls with the semen picture and the histologic findings in the testicle recovered upon slaughter of the animal.

A summary of this work shows that there is a definite relationship between the semen picture and the condition of the testicle. A report upon this work will be published at a later time.

## Dilutions

Two methods have been used for the dilution of semen in the work reported in this paper. First, mucus of estrum was used and second, the Russian formula.

Since, in the majority of instances, the semen has been collected from the vagina following service, more or less mucus of estrum has been collected with the specimen. If the specimen was poor in sperms, no further dilution was made, but in cases where there was very little mucus of estrum and the sperms were numerous it was diluted with the Russian formula to the volume required to inseminate the cows on hand.

The Russian formula is as follows:

Solution 1

| | |
|---|---|
| Glucose (anhydrous) | 54.0 gm |
| Distilled water | 1000.0 cc |

Solution 2

| | |
|---|---|
| Potassium di-hydrogen phosphate | 3.2 gm |
| Dibasic sodium orthophosphate | 16.8 gm |
| Distilled water | 1000.0 cc |

Solutions 1 and 2 are mixed in equal proportions. Semen can be diluted, two, four, eight or 16 times. This formula is taken from a report of the Russian workers.

A comparison of the effect of diluting fluids upon the motility, longevity, and upon the number of cows successfully inseminated with each kind does not reveal differences between the mucus of estrum and the diluent prepared according to the formula.

## The Significance of Epithelial Cells and Blood Corpuscles in the Semen Specimen

During the estrual cycle of most females, the vaginal mucosa exfoliates epithelial cells. During estrum, the vagina contains a large amount of mucus that is nearly free from any type of cell. There are a few large squamous epithelial cells without nuclei. There should be no polymorphs at this stage. Polymorphs appear during the diestrual period, and their presence during the estrual stage serves to complicate the picture. I am of the opinion that

in the case of heifers there is an occasional instance in which the vaginal mucus contains white blood cells and that their presence is not pathognomonic of infection. This is based upon the absence of a reaction of any kind except the congestion that normally accompanies estrum. Red blood cells are occasionally present as a result of injury during forceful copulation, particularly in the case of heifers. Blood makes its appearance twelve to 24 hours following estrum, but should not be found in the semen specimen taken during the early period. Diamond-shaped cells are shed by the sheath of the bull but are seldom found in the semen recovered from the vagina. However, the massaged specimen is rich in them.

The semen specimen that is recovered from the vagina following copulation is never free from fecal contamination, so bacteria in large numbers can always be found in the specimen. The mucous membrane of the cervix and its mucus must be depended upon to act as a barrier to infection and a gateway to the sperms.

During the microscopic examination of semen, one should always be on the lookout for trichomonads or any considerable

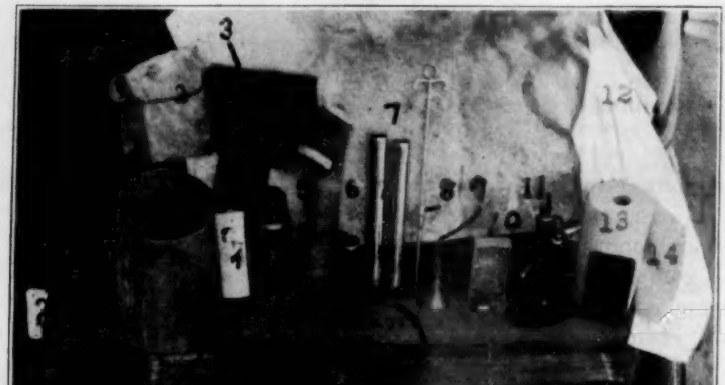


FIG. 1. Equipment used in artificial insemination: 1, irrigating-can; 2, rubber apron; 3, rubber sleeves and gloves; 4, glove powder; 5, Thermos bottle; 6, rubber sack; 7, vaginal speculum; 8, inseminator and semen collector; 9, glass funnel; 10, slides and cover-slips; 11, microscope; 12, apron; 13, paper towels; 14, hemocytometer; 15, batteries and cord; 16, records.

mass of bacteria or cells that would point toward the suspicion of unfitness for use.

### Method of Insemination

Cows to be inseminated are placed in stocks, the tail held to one side, and the pudenda washed with warm water. A lighted speculum is introduced into the vagina and its contents carefully examined. The cervix is also given a thorough inspection. Only healthy individuals are inseminated. The cow from which the semen is taken should be examined prior to service, and only healthy individuals used as donors.

The semen is collected by means of a glass syringe and placed in a test-tube. It is then examined and diluted according to the number of cows to be inseminated.

Two to 4 cc of semen is placed well within the cervix by means of the glass syringe.

### Discussion

Dr. Cassius Way: I certainly cannot add anything of importance to what Dr. Kingman has said. It has been a very interesting paper to me, because I have endeavored to practice this method to some extent. I may be more fortunate, or possibly less fortunate, due to the fact that I am working in the East, with dairy herds, and we do not have to cope with certain range conditions which are bound to exist in the West. What little artificial insemination I have practiced, however, seems to have been fairly successful. I have found the results to be about 40 to 50 per cent, as Dr. Kingman has suggested his results were this year.

The work wherein I have used this method has been with animals that were difficult to breed, that is, the breeding record was bad. I have found in the majority of those cases that cervicitis is the primary cause of sterility. In these instances I have used artificial insemination with about the percentage of success Dr. Kingman reports. Before impregnation, I endeavor to treat the animal, getting the uterus as normal as possible, reducing the inflammation in the cervix, and reducing to a minimum the gray appearance, or the appearance of possible infection, in the vaginal secretion. I do this for about two months in cases where I have attempted artificial insemination, with the results I have indicated.

I am interested in the fact that Dr. Kingman recommends the use of rubber or glass instruments. I am wondering if he would enlighten us in regard to that. Why is it necessary to exclude the use of metal syringes and instruments?

Dr. Kingman: I ran across that in the report of the Russian workers. I don't know why metal should not be used. I supposed it was because of the possible ionic change or something that might take place in the semen specimen. I have no definite proof. The first inseminator I made was of metal, and I threw it away because it might be a factor in preventing successful results. However, I have no definite evidence that it is actually detrimental to the semen specimen.

Dr. Way: Do you place the semen in the uterus or just in the mouth of the cervix?

Dr. Kingman: In the mouth of the cervix only. I use a lighted speculum.

DR. WAY: May I add another thought? In the work I have done I have used a method which is somewhat different, in that I retract the cervix with a pair of Hopper cervical forceps. The cow is washed as clean as possible with warm water and soap, then rinsed with clean, warm water—boiling water which has been cooled to the proper temperature. The cow is served and the semen is then collected from the vagina. I then retract the cervix with a pair of Hopper cervical forceps and insert a catheter, a tube which is similar to the Albrechtsen catheter. The injection of semen is then made directly into the uterus with a Record syringe.

I have found this method to be most successful, especially in cases of cervicitis, where it was necessary to get by the folds of the cervix which are enlarged and possibly infected.

DR. J. B. HAGENBUCH: I was very much interested in hearing about the solution Dr. Kingman said he used. In our work we use a normal saline solution instead of the glucose which Dr. Kingman uses. We were able to dilute our solution one to four. We found that was not too much dilution.

DR. KINGMAN: How did you collect the specimen you diluted that way?

DR. HAGENBUCH: It was collected from the vagina.

DR. KINGMAN: It was already diluted, was it not, so that you could not tell exactly how many sperms there were?

DR. HAGENBUCH: Our work was done when we were very short of pure-bred bulls, and we tried to impregnate as many cows as we could with these good sires. We found that five cows were all that we could impregnate. When we tried to exceed that number, our results were not satisfactory. We tried to impregnate as soon as the cow was bred. We kept the sperms as short a time as possible.

I want to emphasize what Dr. Way said. With cows that were what we call "difficult breeders," we also noticed that the condition of cervicitis was very much relieved if the cows were impregnated, and the next year those cows conceived very readily.

I agree with Dr. Kingman that this work is far from perfected. He got better results than we did. Our record was only 25 per cent. Considering what he has reported as being possible, I am encouraged.

DR. C. W. FRUSH: Has there been any work along this line done on any animals other than cattle?

DR. KINGMAN: There has been a great deal of work done upon sheep and some upon dogs. Some of you may know of a report that was made by a student at Manhattan. Dr. Frank, didn't some of your students report on a case of artificial insemination of a dog?

DR. E. R. FRANK: Yes.

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## Teaching the Young Idea How to Shoot

Seven adults and four juniors attended a blackleg vaccination demonstration in the Meeks school community, Monday of this week. Twenty-one animals were vaccinated for blackleg at this demonstration. The farm agent vaccinated three of these animals in demonstrating how the procedure was carried out, after which the vaccinating needles and serum were turned over to the group so that those in attendance might participate in the demonstration.—L. H. Stinnett, Cleveland County Agent.

*The Oklahoma Extension News.*

# HYPERSENSITIVITY IN DOMESTIC ANIMALS

## A Review*

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### INTRODUCTION

Hypersensitivity is a broad term used to designate a condition in an individual which causes him to react to an agent which has no effect upon other individuals of the same species. This state is comparatively well known clinically in the human. As examples might be mentioned such diseases as asthma and hay fever, food rashes and drug idiosyncrasies. Diseases of this type are not so well known among animals. There are several reasons why this is the case. The symptoms are frequently so mild that they escape attention, or, in the case of the dog, scratching or licking certain parts may be attributed to fleas. Again, the haircoat and the pigmentation of the skin of many animals may obscure erythematous areas.

When I agreed to prepare a paper on this subject I realized that I could not contribute any knowledge gained by clinical experience, and, also, that I had nothing new in the way of experimental evidence to add to existing knowledge. I hope that a necessarily brief review of the subject may serve to stimulate interest and discussion and perhaps be the means of indicating problems for further investigation.

### THE NATURE OF HYPERSENSITIVITY

In the past, it was believed that there were a number of types of hypersensitivities and, further, that these types were essentially different in that they depended upon different mechanisms. While many of the agents causing these reactions were definitely antigenic in nature, there were others which were not, particularly such substances as quinine, formalin, etc. Likewise it was found that while the substances in the body which rendered the individual hypersensitive were in many respects like antibodies, there were certain differences. Experiments conducted more recently have filled in these gaps in our knowledge to some extent. They have served to simplify a subject, complex enough in itself, by making possible the elimination of terms. These have con-

*Presented at the seventy-second annual meeting of the American Veterinary Medical Association, Oklahoma City, Okla., August 27-30, 1935.

fused the novice and have acted as a scientific smoke screen obscuring the real nature of the problem.

The trend of opinion at the present time is toward a simplification of our terminology in this field. Zinsser,[1] in discussing hypersensitivity, states:

> We have no hesitation in expressing the belief that anaphylaxis to proteins in animals, and all the forms of human idiosyncrasy are basically related in mechanism—depending upon a cellular reaction between a whole or partial antigen and a specific sessile antibody or reagin, which has been developed as a result of previous contact or sensitization.

Topley,[2] in discussing the same subject, states:

> So far as our present knowledge goes it seems very probable that all the phenomena of anaphylaxis, of hypersensitiveness, and of immunity of the type dependent on the development of specific antibodies, result from the working of a single underlying mechanism, the character of the total reaction being determined in each particular case by a variety of secondary factors.

Hypersensitivity, then, depends on the same mechanism responsible for immunity. It may be said to be a case of immunity gone wrong. The reaction is one between antigen and antibody occurring on or in the tissues. The more favorable the circumstances for this situation to prevail, the most likely is the hypersensitive individual to suffer a reaction. A knowledge of the hypersensitive state is, therefore, based on a knowledge of antibody production. Without such knowledge we cannot understand this condition nor can we take rational steps to prevent it. Therefore, at the risk of seeming to digress from the subject, I think that a brief discussion of this topic will prove profitable. For details the reader is referred to such books as Topley, or Zinsser, cited above.

## Antibody Production

All of the facts of antibody production are not subject to experimental demonstration. Enough of them are, however, to enable us to fill in the gaps by imagining what must take place.

Every normal animal is equipped to clear the body of foreign substances which gain entrance to the tissues without their having first been split into innocuous compounds by the digestive juices. This process is known as phagocytosis and is carried out by a group of cells known as the reticulo-endothelial system. This fact can be demonstrated experimentally. When particulate substances such as bacteria are injected intravenously into the animal, they disappear from the circulation, as indicated by bacteria counts made with circulating blood. Furthermore, the phagocytized bacteria may be demonstrated within the reticulo-endothelial cells in smears made from organs in which the latter are

numerous, as for instance, the liver and spleen. If a normal and a previously immunized animal are compared as to their phagocytic ability, it will be found that the immunized animal is able to remove injected bacteria from the circulation more quickly and more completely than is the normal animal. This fact is illustrated in table I, taken from Topley.[2]

TABLE I—*Showing the number of pneumococci per cc of circulating blood at various times after inoculation of a virulent strain into normal and into actively immunized rabbits.*

| TIME AFTER INJECTION | NORMAL | | IMMUNIZED | |
|---|---|---|---|---|
| | RABBIT 247 | RABBIT 248 | RABBIT 299 | RABBIT 300 |
| Immediately | 870,000 | 1,100,000 | 1,000,000 | 1,000,000 |
| 5 hours | 1,300 | 3,300 | 12 | 68 |
| 24 hours | 142,000 | 1,953,000 | 0 | 289 |
| 48 hours | 2,800 | Innumerable | 149 | 79 |
| 96 hours | Dead | Dead | 0 | 0 |

As a result of the immunizing process, the animal has acquired an increased ability to phagocytize the agent against which he has been immunized. This ability depends on the presence of a new substance, not possessed by the normal animal, in his circulating body fluids. This specific substance we call antibody. Since the sole function of antibody in the living animal is to promote or facilitate phagocytosis, what is more logical than to assume that the phagocytic cells have something to do with its production? Experiments indicate that this assumption is correct. The reticulo-endothelial system appears to be the site of antibody formation.

While we cannot follow the disposition of non-particulate substances in the body, there is no reason to suppose that it is any different from that of bacteria. We might visualize the process of antibody formation to take place as follows: If the phagocytized substance is antigenic, the reticulo-endothelial cells begin the production of antibody. The antibody is at first attached to these cells. As it continues to be produced, it is given off by them into the circulating body fluids, from which it is probably immediately absorbed by the tissues generally. Such antibody is spoken of as sessile antibody. When the absorptive power of the tissues is satiated, antibody begins to be detectable in the body fluids, notably the blood plasma, by means of the various test-tube reactions. Such antibody is called circulating antibody, to distinguish it from sessile antibody. When the stimulus to

antibody formation ceases, the antibody begins to disappear. It disappears in the reverse order: first from the circulation and then from the cells. Its disappearance may be complete if sufficient time elapses. These facts are illustrated graphically in figure 1, taken from Topley.[2]

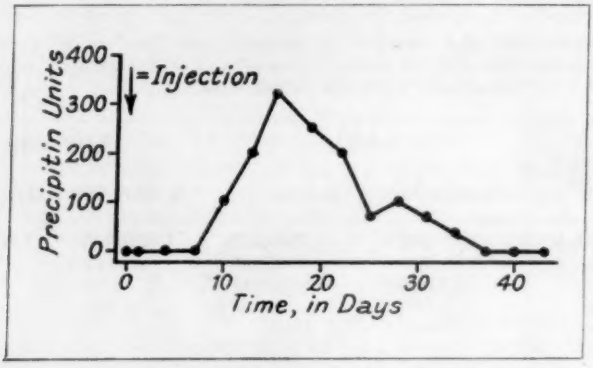


FIG. 1. Precipitin production. Response of rabbit to single injection of horse serum. (After Dean and Webb.)

In the graph in figure 1 it will be noted that antibody does not appear in the circulation until between the eighth and tenth days following injection. It reaches its highest concentration about the 16th day and then ceases to be detectable from the 37th day on. During the induction period (first eight days), and after the 37th day, in this particular instance, there is a state in which the antibody is present on the cells, or is sessile. When such a relationship exists, an individual is in an ideal hypersensitive state.

Another factor which has a bearing on antibody production and is concerned with bringing about a state of hypersensitivity is the quantity of antigen introduced into the tissues of the animal. It is conceivable that the amount of antigen may be so small that the stimulus is not great enough to cause antibody to appear in

TABLE II—*Showing the mean values of the highest titre of flagellar agglutinins in small groups of rabbits injected intravenously with different doses (per k.b.w.) of Bact. paratyphosum B.*

| BACILLI INJECTED (PER K. B. W.) | RABBITS TESTED | HIGHEST TITRE (MEAN VALUE) |
|---|---|---|
| $10^8$ | 3 | 3,540 |
| $10^7$ | 3 | 1,860 |
| $10^5$ | 6 | 330 |
| $10^4$ | 4 | $0^1$ |

10=No agglutination at a dilution of 1:4.

the circulation. There may, however, be some sessile antibody produced which may render the individual hypersensitive. This fact is demonstrated experimentally in another illustration (table II) taken from Topley.[2]

In the fourth group of rabbits, which received an injection of 10,000 bacilli per kilo of body weight, no circulating antibody was detectable, yet they may have possessed sessile antibody which we have no way of detecting in the living animal.

There is a third fact in connection with anti-body production which has a bearing on the hypersensitive state. If an animal has come in contact with an antigen at some time and is reinjected, or reëxposed under natural conditions, the second response differs from the first. Let us assume that the animal which furnished the data for figure 1 was reinjected sometime after the

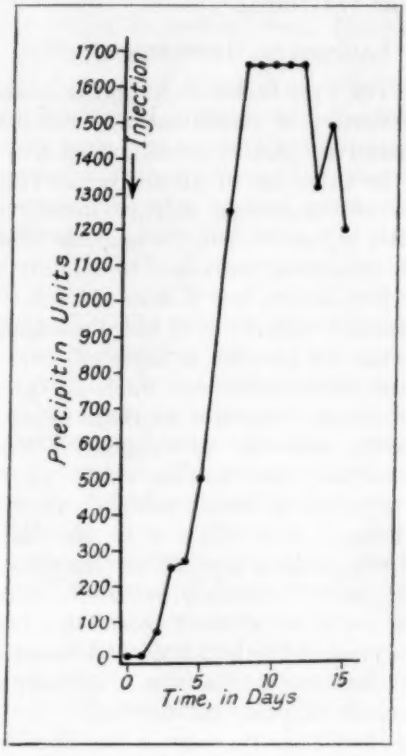


FIG. 2. Precipitin production. Response of previously sensitized rabbit to single injection of horse serum. Secondary response. (After Dean and Webb.)

40th day. No circulating antibody could be demonstrated at this time. In this animal, however, a residual immune mechanism exists, which, on reinjection of the same antigen, begins antibody production more promptly than was the case after the first injection. In addition to being more prompt, the antibody response is apt to be more copious also. Experimental evidence of this fact is furnished in figure 2, for which we are again indebted to Topley.[2] In this animal it will be noted that antibody begins to appear in the circulation between the first and second days. It increases very rapidly in concentration, reaching its maximum in eight days, instead of 16. It begins to decrease about the twelfth day and the decrease is apt to be more gradual than following the first injection. The nature of this response explains why hypersensitive individuals are apt to be refractory for a time following a reaction. It is also employed as a therapeutic measure to desensitize such an individual.

## Factors in Hypersensitivity

*Sensitization:* The first factor in bringing about a hypersensitive state is the matter of sensitization. Sensitization may be either active or passive. Active sensitization may be induced experimentally by the injection of an antigen. The manner of injections, whether subcutaneous, intraperitoneal or intravenous, seems to have little influence, but the amount of antigen injected does. A certain minimum, sufficient to stimulate antibody production, must be introduced, but it does not follow that a greater degree of sensitization will result if large amounts are employed. In fact, if too large an amount is injected, the animal is liable not to be rendered hypersensitive. Such an injection results in too copious an antibody response so that, in addition to sessile antibody, circulating antibody also appears. Moderate amounts are most effective since when they are employed the ideal anaphylactic state, the presence of sessile antibody with little or none in the circulating fluids, is most likely to be attained.

The nature of the antigen also affects the amount necessary to sensitize. In the case of strongly antigenic substances, such as blood-serum, the requisite amount is smaller than with weaker antigens. In the case of the latter several injections may be necessary before the immune mechanism is sufficiently stimulated to result even in sessile antibody production.

Under natural conditions there are a number of portals of entry by means of which antigenic substances may gain access to the tissues, and thus bring about sensitization. Of these, ingestion is one of the most important. It is a known fact that the gastro-intestinal tract of young animals is more permeable than that of

mature animals. Sensitization may, therefore, take place early in life through the passage of larger chemical complexes through the intestine than would be possible later. Increased permeability of the intestine may be a secondary condition accompanying such general conditions as marasma or other debilitating disease. Sensitization may take place at this time.

Even under normal conditions there may be passage of certain sensitizing substances through the intestinal barrier. This has been demonstrated with particular clarity by Walzer[3] in the human, using the Prausnitz-Küstner reaction. He cites others who have demonstrated the same fact by other means. Sensitization may also take place by inhalation. Pollen, dust, dander and hair sensitizations, in all probability, are brought about in this manner. Guinea pigs have, in several instances, been experimentally sensitized by this means. In some instances there seems to be evidence of sensitization by contact with the skin. Finally, in bacterial infections and parasitic infestations, sensitization is brought about by the causative agent gaining access to the tissues through their own powers of invasion and multiplication.

It has sometimes been suggested that hypersensitivity is inherited. The consensus at the present time seems to be that this assumption is untrue. While a number of persons in the same family may be asthmatic, they frequently are not hypersensitive to the same substance. They may inherit a predisposition to hypersensitivity but not the condition itself. It is the same situation as in the matter of the inheritance of infectious diseases. Just as with the latter, infection may occur *in utero*, so also with the former, sensitization may occur prenatally, as a result of the passage of sensitizing agents from the maternal to the fetal circulation. Sensitization may occur also in suckling infants, due to the presence in the milk of substances in the food of the mother which have passed the intestinal barrier and have been secreted by the mammary gland.

Serum therapy also may be the means of sensitization. The injection of sera in the treatment or prevention of infectious diseases, if they originate from a foreign species, may actively sensitize against the protein of that species. Such procedures as the injection of toxin-antitoxin mixtures, diphtheria antiserum, tetanus antiserum, and other biologics may be the means of sensitizing against horse serum.

Passive sensitization may be brought about by the injection of antibody-containing serum from some other animal. The antibody from such serum becomes attached to cells and becomes sessile antibody as far as the injected animal is concerned. Passive

sensitization can be effected with regularity if the donor of the antibody-containing serum is of the same species as the individual to be passively sensitized. If the species are heterologous, the transfer cannot always be effected. For example, it is comparatively easy to sensitize guinea pigs passively when the antibody is contained in rabbit serum, whereas if horse serum is the source of antibody the transfer of sensitivity is not possible. It has been found also that the ability of a given serum to sensitize passively is in direct proportion to its antibody content.

*Incubation period:* Following either active or passive sensitization, there is a period known as the incubation or induction period. Under experimental conditions this period may be a matter of a week to a month, in the case of active sensitization, or four or more hours in the case of passive sensitization. This time interval corresponds to the time necessary for the antibody mechanism to be in the proper state in the first type and for the preformed antibody to become attached to cells in the second type.

*Reëxposure to antigen:* When an animal in the hypersensitive state is reëxposed to a substance to which it has been sensitized, a reaction occurs, the severity of which depends upon a number of factors. The damage is done by the union of antigen and antibody on the tissues. Circulating antibody may act as a buffer, diminishing or, if present in sufficient amount, preventing any ill effects whatever. The most severe results follow if a comparatively large amount of antigen unites with the antibody at one time. If the antigen reaches the tissues and unites with the antibody in small amounts over a longer period, the result will be less severe. In producing a shock experimentally, therefore, the intravenous method of injection is most effective. The shock dose should also be large, at least ten times the sensitizing dose. If the injection is made intraperitoneally or subcutaneously, the antigen is more slowly absorbed and the resulting injury is less severe. Under natural conditions, the antigen causing the shock is inhaled, ingested, or comes in contact with the skin. For these reasons the shock is apt to be mild and may be local in character.

*The rôle of haptenes:* Substances of the group designated by Lansteiner as haptenes sometimes induce a hypersensitive reaction. Haptenes are substances which are not capable of forming antibody when injected in an isolated state. However, when they are injected as part of a mixture containing protein, as for instance in their natural combined state, as part of a bacterium or a tissue, antibodies are formed against them. These antibodies are frequently quite specific for the haptene part of the complex,

the protein part of the mixture playing a secondary rôle. Haptenes will react with such antibody in the test-tube in characteristic fashion. It is not surprising, then, to find the same thing occurring when the animal body acts as the test-tube. The substance to which the animal is sensitized must be antigenic and contain the haptene as part of the complex. At least a portion of the antibody produced in response to this sensitization will be directed against the haptene. When the haptene is introduced into an animal so sensitized, it unites with this antibody and the reaction ensues.

### Symptoms in a Hypersensitive Reaction

The symptoms of a hypersensitive reaction are very variable, being an expression of a combination of factors in a given case. These factors are, first, the antigenic nature of the substance to which the individual is hypersensitive. Most severe reactions are observed when the substance is strongly antigenic, as, for instance, serum. Weak antigens induce less severe symptoms. Another factor is the manner in which the shock substance comes in contact with the tissues as explained above. A third factor is the species involved. Guinea pigs are most subject to severe reactions. The rabbit is less susceptible, as are also the dog and man.

An interesting thing about the symptoms of hypersensitivity is that they are the same regardless of the antigen involved. The symptoms of shock caused by, let us say, horse serum will be the same as those in a shock caused by beef serum or egg white. This is important from the clinical standpoint since it means that no information as to the cause of a hypersensitivity may be obtained from the symptoms.

The union of antigen and antibody on or in the cells initiates a train of symptoms the mechanism of which we do not understand. The changes in the body which follow this union may be so profound as to cause the death of the animal within a few minutes. From this severe reaction all shades and degrees of symptoms may be observed: severe, non-fatal, generalized reactions; severe, local reactions; mild, local reactions, and reactions which enter into the realm of the subjective in the human.

The symptoms vary somewhat in the different species due to differences in susceptibility and physiological makeup. One of the most pronounced symptoms is a contraction of the smooth muscle throughout the body. This is manifested by urination, defecation, and vomiting in some species (dog). The uterus also contracts and if the reaction occurs in a pregnant female there may be abortion. The smooth muscle bands surrounding the bronchi and blood-vessels also contract. In the guinea pig this

may result in death by suffocation, due to complete occlusion of the bronchi. In the rabbit a fatal outcome is the result of dilatation of the right heart, due to stoppage of the arterial portion of the pulmonary circulation.

These contractions of the smooth muscle bands are independent of nervous control. The contraction of the smooth muscle also results in an initial increase in blood-pressure which is succeeded by a fall due to dilatation of the capillaries. There are also certain changes in the vessel walls which are responsible for the hemorrhages sometimes seen and for the edema. The edema results from increased permeability of the vessel walls and may be general or local. In acute shock there is a drop in temperature amounting to several degrees. In protracted cases there may be a rise in temperature.

## Desensitization

If an animal recovers from a hypersensitive reaction, he is usually refractory for some time. He is said to be desensitized. This desensitization may be due to the combination of all or most of the sessile antibody with the injected antigen. Another possible explanation is that reinjection may have stimulated antibody formation to the extent that circulating antibody is present for a time. The circulating antibody may act as a buffer. Weil[4] found that shock in a sensitized guinea pig could be ameliorated by the injection of large amounts of antibody containing serum before the shock dose of antigen was administered. This result may also be attained by the injection of the shock dose of antigen. If the animal survives, he will produce antibody very quickly and in large amounts, since the immune mechanism for that particular antigen is already set up. His response will be like that illustrated in figure 2.

The duration of the period of desensitization is quite variable. Experimentally the refractory stage in guinea pigs and rabbits has been found to be several weeks.

## Diagnosis of the Hypersensitive State

There are two types of methods available for the diagnosis of the hypersensitive state. The first method consists of the local application of the substance or substances to which the individual under test is suspected of being hypersensitive. In some cases the test substance is injected in its natural state in diluted form, as for instance in the case of serum, milk or egg white. In other cases an extract of the material is prepared in a physiological solution of sodium chloride or in buffered physiological salt solution. The latter method is employed with various solid foods,

feathers, dander, etc. The most satisfactory method of application is the intradermal injection of small quantities (0.05 to 0.1 cc). If the individual is hypersensitive, the injection site will begin to itch a few minutes after injection. A reddening of the skin then appears which may be several centimeters in diameter. This reddened area is also swollen, due to local edema, its surface being raised above that of the unaffected skin.

The diagnostic agent may also be applied to the conjunctiva as in the ophthalmic tuberculin test, or held in contact with an area of shaved and scarified skin by means of gauze and adhesive.

Another diagnostic method is that of local passive sensitization, known, after its discoverers, as the Prausnitz-Küstner reaction. Küstner was sensitive to fish. A small quantity of his serum was injected intradermally into the skin of Prausnitz' forearm. After a time the same area was injected with fish protein and a reaction ensued. A non-sensitized area injected with the same protein did not react. This method has been extensively used in the diagnosis of hypersensitivity with very valuable results. An individual of the same species as the one under test should be selected. In animals an individual with an unpigmented skin, or at least unpigmented areas of skin, should be chosen. This reaction is not infallible and some skins may fail to become sensitized. It is a valuable check on the diagnostic skin tests, however.

## Therapeutics of Hypersensitivity

Once the cause of hypersensitivity in an individual has been determined, one is in position to institute rational therapy. If possible the cause should be removed. In the case of articles of diet, this may be fairly readily accomplished. If pollen is the offending agent, the individual affected may be able to remove to another locality during the pollination season. There are some agents, however, which cannot readily be removed from the environment. In the case of house dust, for instance, this procedure is not practicable. In such a situation an attempt may be made to desensitize the affected individual and maintain him in such a state. This may be done by injecting the offending agent or otherwise exposing the hypersensitive individual to it so that the sessile antibody is neutralized. This is an objective that is difficult to accomplish but is sometimes the only hope of relief.

## Pseudo-Hypersensitivities

The injection of certain agents may give rise, in certain individuals, to symptoms which resemble very closely those of a true hypersensitive reaction. The serum of certain species may be

primarily toxic for others. Goat serum injected into guinea pigs and rabbits exhibits this action. Among the various species of animals the cat seems to be particularly susceptible to such injections. Peptone also is capable of inducing some of the symptoms referred to, probably because of its action of increasing capillary permeability. The pseudo-reactions can be differentiated from true hypersensitivities because, since they do not depend upon an antigen-antibody mechanism, they cannot be transferred passively by such a method as that of Prausnitz-Küstner.

The veterinary literature does not contain many articles on clinical experiences with hypersensitivity. The few that I have encountered I have grouped on the basis of form and cause and will review as briefly as possible.

## Clinical Forms of Hypersensitivities

### Anaphylaxis

Anaphylaxis, the most severe form of hypersensitivity because the reaction is of a general nature, is encountered following the injection of biologics. Schlotthauer[6] describes an incident in connection with the immunization of calves against paratyphoid infection using a vaccine. Unfavorable symptoms also may follow the use of sera, aggressins, etc.

Williams and Hagan[7] describe an incident which occurred during the administration of calf scours antiserum to a group of heifers. Several injections were made without any difficulty being encountered. One of the series of injections, however, made 42 days after the last preceding one, was followed by anaphylactic symptoms. These consisted of edematous swelling in the region of the eyes with excessive lacrimation. There were also swellings in the vulva and udder. In several of the animals there was sweating and one had stertorous breathing. There were no fatalities.

The best procedure when using biologics seems to be to determine first if the animals are sensitive, by intradermal injections or by preliminary injection of small amounts of the product. If the skin tests are negative, or if small doses are tolerated without any disturbance, the therapeutic dose may be administered. Intravenous injection is most apt to be dangerous, so that one must be especially careful with this method, especially if the injected serum is heterologous. It is well also to have a syringe of adrenalin filled and in readiness. If symptoms appear, they can be alleviated by intravenous injection of proper doses of this drug.

The crushing of ox warble larvae in the backs of cattle also may result in anaphylaxis which may prove fatal. This phe-

nomenon has been observed and studied experimentally by Hadwen[8, 9] and by Hadwen and Bruce.[10] There is also a report of a case by Strockbine.[11] Apparently the presence of the larvae in the tissues sensitizes the animal to their protein. Crushing of the larvae in removing them releases enough of their contents so that its rapid absorption causes a shock.

### Food Idiosyncrasy

The food of animals may also be the cause of hypersensitive reactions. In the case of the dog, this matter has been investigated by Schnelle,[12] Burns,[13] and Pomeroy.[14] All of these investigators detected hypersensitivity to certain foods by skin tests and in some cases were able to reproduce symptoms by feeding foodstuffs to which a hypersensitivity was indicated. The symptoms were diarrhea and eczematous lesions. Pomeroy was the only one to use the Prausnitz-Küstner reaction to check on the nature of the skin reactions obtained. The greatest hypersensitivity was manifested against cereals and sea food. More work of this sort should be done, using all of the available methods.

There is a disease known as urticaria in cattle and horses which possibly may come under this category. The cause is unknown but the symptoms (the development of raised edematous swellings on the skin, and sometimes respiratory difficulties) indicate this possibility.

### Respiratory Hypersensitivity

It does not seem unlikely that animals, like humans, may have a sensitization of the respiratory tract. Heaves may be an example in the large animals. Perhaps the dog also is subject to this sort of reaction. While I do not know of any such condition I heard recently of a case which is suggestive. A layman asked me what I thought was wrong with a dog which he described as acting "like a heavey horse." The attack occurred about a month ago and has not reoccurred.

I do not know of any proven cases of drug idiosyncrasy but they probably occur.

### Hypersensitivity of Infections

The tuberculin, mallein, johnin, abortin and pullorin tests are examples of the practical use made of hypersensitivity in the diagnosis of disease. There is one phase of the use of these products which has been puzzling many, namely, that there is not always agreement between these reactions and serological tests. When it is borne in mind that the former depend primarily on sessile antibodies, while the latter are measures of the concentra-

tion of circulating antibody, the reason for the discrepancy is suggested. In our experience with Johne's disease Doctor Hagan and I have found that an animal becomes allergic to avian tuberculin before it is possible to demonstrate antibody in the serum. There then follows a period during the course of the disease when both methods of diagnosis are positive. In general the allergic tests seem to get weaker and the serologic tests stronger until, during the terminal stages of the infection, the allergic tests may be erratic or become negative while the serological test is if anything stronger.

This same observation in the case of a small group of experiment rabbits, in which he was studying the value of skin tests for the diagnosis of bot larvae infestation, was made by Holtman.[15] He found that the animal with the highest titre of circulating antibody gave the weakest skin test. In my opinion the circulating antibody acts as a buffer in these reactions. It fixes the injected antigen or haptene so that less than the full dose reaches the cells. The small amount of injected reagent which reaches the cells and there combines with the sessile antibody elicits a mild reaction. Where there is sufficient antibody in circulation, all of the injected substance may become fixed to the circulating antibody and the reaction then is prevented entirely.

## Conclusion

This brief discussion of the principles underlying the phenomenon of hypersensitivity has been presented with the hope that it will make understandable symptoms which may be observed in the field. It is also hoped that the application of the principles may serve to increase our knowledge of the prevalence and serve a useful purpose in the prevention and treatment of conditions in which it is a factor.

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## Publicizing the Horse

The January 12, 1936, issue of the *American Weekly* carried a full-page story on horses. This was a direct outgrowth of the stallion pulling contest sponsored by the Horse and Mule Association of America last October. The *American Weekly* is a supplement to the Sunday edition of all Hearst newspapers. It is reported to have a circulation of about 5,500,000 copies, and probably about four times that many readers. That ought to help some.

## Silver Foxes in Wisconsin

It is reported that the state of Wisconsin has as many silver foxes as there are in the entire country of Norway. It is estimated that Wisconsin, like Norway, has about 200,000 silver foxes.

## Artificial Breeding of Poultry

Improved methods for the artificial breeding of poultry have been developed by the poultry scientists of the U. S. Department of Agriculture at the Beltsville Research Center. A 97 per cent fertility of eggs was obtained by the new methods, as compared with an average of 85 per cent in natural matings.

With the new methods it is now possible to fertilize more than a hundred hens daily from the semen of one rooster. One or two hens a minute may be bred by the artificial method, it is reported.

The semen is collected from the male bird and transferred to the oviduct of the hen by means of a syringe. Two or three drops of undiluted semen injected daily into a hen is said to be sufficient for maximum egg fertility.

Hens in battery plants can be inseminated by the new procedure without being removed from their laying quarters, which is a distinct advantage. The new method also offers great promise in cross-breeding experiments, especially in cases where it is difficult to get fertile eggs.

# OBSERVATIONS ON PENDULOUS CROP IN TURKEYS*

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Pendulous crop is an abnormality of the ingluvies characterized by a temporary or permanent distention with stagnant liquid or semi-liquid contents. Turkey-growers commonly call the condition dropped crop, hanging crop, baggy crop, sour crop, or water crop. No concrete information about this abnormality, which differs from ordinary impactions, is available in the literature. The yearly incidence ranges from one to ten or 15 per cent of the flock in some bands of turkeys in the semi-arid sections of the West, and many conflicting opinions regarding the causes have been circulated through the popular press. The trapnested turkey flock maintained by the University Poultry Division has had a high incidence of pendulous crop for several years, and has afforded an excellent opportunity for making observations. The data so far available are presented with the hope of clarifying some of the existing impressions concerning this deformity, the exact etiology of which is still unknown.

## SYMPTOMS, COURSE AND MORTALITY

The first evidence is a slight distention of the crop with stagnant liquid or semi-liquid contents. When an affected bird is held head down, considerable liquid will flow from the mouth without any manipulation of the organ. As a rule, the abnormality first appears following excessive water consumption on the first or second day of a heat wave. If cool weather follows, the distended organ may retract, but in most instances it will continue to enlarge until a maximum size for the individual is reached (fig. 1).

The contents of the crop have no odor at first but become sour, acrid, or fetid. The appetite is not affected for several weeks and often not at all, but the food does not seem to be properly assimilated. Most of the birds develop slowly and finally become unthrifty and emaciated. Several birds with marked pendulous crops have, nevertheless, lived for over a year. In such cases, pneumonia, resulting from lung involvement, is usually the cause of death.

Records kept from 1932 to 1934, inclusive, indicate that more than one-third of the cases of pendulous crop make complete

*Presented at the seventy-second annual meeting of the American Veterinary Medical Association, Oklahoma City, Okla., August 27-30, 1935.

recoveries, and about the same percentage die as a direct result of the condition. A summary of these and other data regarding 206 cases kept under observation until death or maturity are given in table I.

The large number of spontaneous recoveries in 1932 may have been due to the fact that some attention was given that year to draining the crops at daily intervals by artificial manipulation. In 1933, this was also done to some extent, and, in addition, the crops of a few of the worst cases were washed with a weak antiseptic. In 1934, all treatment was discontinued in order to study the effect on the flock.

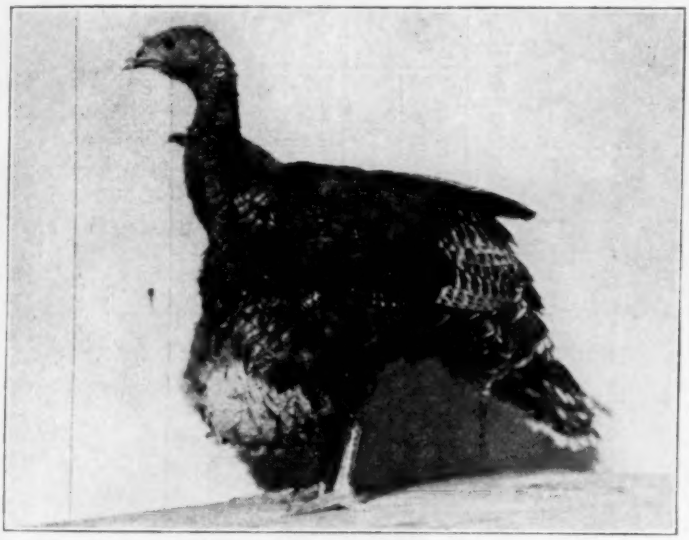

FIG. 1. An eight-month-old female turkey with a pendulous crop of about five months duration.

Deaths have been due principally to self-inflicted lacerations of the skin and crop membrane resulting in a rupture of the organ, to injury by mates when a bird was too weak to defend itself, and to pneumonia. Very few birds have died before they were 20 weeks of age. Those that were killed to relieve suffering constituted about one-fifth of the total, and they lived to maturity (24 to 32 weeks). Only 4.85 per cent of the ones that did not recover were fit for market at maturity, and none of these was a first quality specimen. The rate of mortality is, therefore, approximately 60 per cent of all turkeys that developed the abnormality during the three years.

TABLE I—*Disposition of pendulous-crop cases.*

| YEAR | CASES OBSERVED | RECOVERIES | | DEATHS DUE TO PENDULOUS CROP | | DEATHS DUE TO OTHER CAUSES | | KILLED TO RELIEVE SUFFERING | | KILLED FOR MARKET | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1932 | 45 | 31 | 68.89 | 5 | 11.11 | 2 | 4.44 | 6 | 13.33 | 1 | 2.22 |
| 1933 | 35 | 13 | 37.14 | 9 | 25.71 | 1 | 2.86 | 7 | 20.00 | 5 | 14.28 |
| 1934 | 126 | 29 | 23.02 | 58 | 46.03 | 4 | 3.17 | 31 | 24.28 | 4 | 3.17 |
| Totals | 206 | 73 | 35.44 | 72 | 34.95 | 7 | 3.39 | 44 | 21.36 | 10 | 4.85 |

## Autopsy Findings

If a poult is killed within a few days after the crop has become distended, the contents are usually liquid and have a sour odor. The mucous membrane in this stage lacks tone, is noticeably thin, but shows little or no inflammatory changes. In later stages the contents may be liquid or semi-liquid, varying with individuals and depending probably on the type of fermentation. If a bird

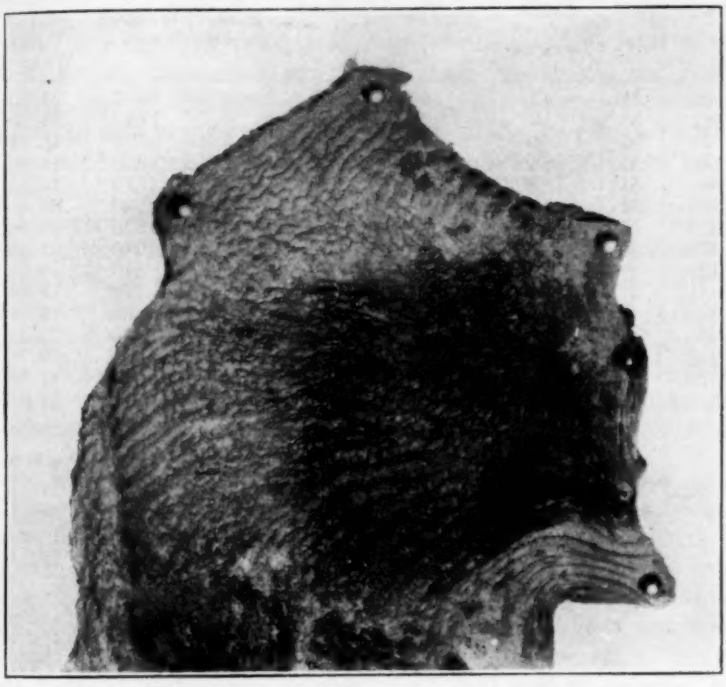

Fig. 2. Section of a pendulous crop showing thickening and ulceration of the mucous membrane.

lives for several weeks, dirt, gravel, and fecal matter are usually found in the crop as the result of a depraved appetite. The mucous membrane of the bulbous portion, in such instances, becomes markedly thickened, ulcerated, and is often covered with necrotic scales, some of which wash off readily while others are diphtheritic in nature (fig. 2). In a few specimens the mucous membranes have been covered with typical mycotic lesions from which pure cultures of *Monilia albicans* have been isolated. No consistent micro-flora have been found, however. The contents in these later stages have a marked acrid or a fetid odor, depending on their nature and the pathological changes in the mucosa.

Examples of the relation of the size of the crop and its contents to the total weight of the bird are given in table II. The 15 birds selected for this summary were at least 28 weeks of age when

TABLE II—*Comparison of the weight of the crop and its contents with the total body weight.*

| TURKEY | SEX | AGE WHEN FIRST OBSERVED (WEEKS) | AGE WHEN KILLED (WEEKS) | TOTAL WEIGHT (GRAMS) | CROP AND ITS CONTENTS | | |
|---|---|---|---|---|---|---|---|
| | | | | | SIZE (INCHES) | WEIGHT (GRAMS) | PERCENTAGE OF TOTAL WEIGHT |
| 42 | M | 13 | 34 | 7500 | 10 | 1800 | 24.00 |
| 322 | M | 16 | 32 | 6900 | 8 | 1740 | 25.22 |
| 375 | M | 10 | 32 | 5020 | 5 | 760 | 15.14 |
| 476 | M | 18 | 34 | 5910 | 5 | 830 | 14.06 |
| 594 | M | 9 | 28 | 9920 | 8 | 1870 | 18.85 |
| 1238 | M | 14 | 28 | 7320 | 10 | 2230 | 30.46 |
| 1326 | M | 12 | 28 | 7810 | 10 | 1930 | 24.76 |
| 378 | F | 10 | 32 | 4910 | 6 | 1040 | 21.18 |
| 409 | F | 16 | 32 | 5880 | 8 | 540 | 9.18 |
| 481 | F | 10 | 35 | 5260 | 4 | 470 | 8.94 |
| 628 | F | 12 | 30 | 3460 | 5 | 480 | 13.87 |
| 1095 | F | 12 | 28 | 6520 | 9 | 1920 | 29.14 |
| 1294 | F | 24 | 29 | 5820 | 7 | 1150 | 19.76 |
| 1320 | F | 16 | 28 | 5290 | 5 | 930 | 17.58 |
| 1325 | F | 20 | 29 | 3750 | 5 | 810 | 21.60 |

killed for autopsy. All were in poor condition. They were selected as representative because the pathological crop was the principal autopsy finding. The measurements recorded were those of the greatest transverse diameter when the bird was in a standing position. If any feathers remained on the crop at this stage, they were pulled before the size was determined. The weight of the contents was influenced largely by their nature, and, because of this fact, there was no correlation between size and weight.

Bronchial pneumonia caused by aspiration of crop contents has been associated with many of the cases studied. Previous to 1934, it was thought that the high incidence of aspiration pneumonia was due to attempts at mechanical draining of the crops and certain treatment methods. In 1934, however, when no effort was made to influence the recoveries by any form of treatment, 24 (24.74 per cent) of the 97 cases that were examined had either bronchial pneumonia or air-sac infection or both. This is approximately the same incidence experienced in each of the other years. As much as three-fourths of an entire lobe was caseated in some cases. When the air-sacs were infected, the

lesions were similar to those of aspergillosis, but in only one instance was an *Aspergillus fumigatus*-like mold isolated.

Microscopic examinations of bronchial exudates taken from the site of the early lesions showed definite evidence of food particles and sand grains. The ease with which the liquid portions of the crop flow from the organ when the head is lowered probably accounts for the aspiration of contents into the lungs.

## Factors Influencing the Incidence

The incidence of pendulous crops in the commercial turkey flocks under observation has varied from less than 1 per cent to 15 per cent of the total flock. Unverified reports of outbreaks involving as many as 25 per cent of the birds have been received. These outbreaks have been mainly in small flocks sired by one or two males.

A summary of the number of cases that appeared in the University flock during the three years, 1932 to 1934, inclusive, is given in table III. The total number of turkeys in the flock was calculated on the basis of the number alive at twelve weeks of age. This was necessary to avoid including poults that had not reached a susceptible age before death. Some of the 1934 poults were from special matings made to study the genetic relation of the condition to the hereditary factors involved. These matings are discussed in detail below.

*Heredity:* The incidence of pendulous crop among the progeny of different males in 1932 and 1933 (table IV) indicated that heredity might be a factor. Of 55 birds that developed pendulous crops in 1932, 33 were from two males, and the percentage of poults affected among the progeny of these males was 9.32, or approximately three times the percentage among the progeny of the five other males. There were comparatively few cases in 1933 but more than half of them were from one male (TM-135).

In order to determine whether there was a genetic basis for the significantly larger number of birds with pendulous crops from some males than from others, three females with pendulous crops were mated to a male with a pendulous crop in 1934. A female (T-283), whose progeny had been entirely free from pendulous crop in 1933, also was mated to this male. The results are summarized in the last line of table IV (1934X). One of the pendulous-crop females produced no progeny, while only nine were obtained from another (T-408), of which four developed pendulous crops. Twenty-three progeny from the third pendulous-crop female (T-410, a sister of the male) survived to twelve weeks of age, and 15 developed pendulous crops. From the normal hen (T-283) 21 birds survived to twelve weeks and five

TABLE III—*Incidence of pendulous crop in the University Farm flock.*

| YEAR | TURKEYS IN FLOCK | TURKEYS WITH PENDULOUS CROPS | | DISTRIBUTION ACCORDING TO AGE IN WEEKS WHEN FIRST OBSERVED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 5–8 | | 9–12 | | 13–16 | | 17–32 | |
| | | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1932 | 996 | 55 | 5.52 | 0 | 0.00 | 42 | 76.36 | 8 | 14.55 | 5 | 9.10 |
| 1933 | 981 | 38 | 3.88 | 1 | 2.63 | 26 | 68.42 | 8 | 21.04 | 3 | 7.89 |
| 1934 | 1369 | 143 | 10.44 | 2 | 1.19 | 73 | 44.07 | 47 | 27.73 | 45 | 26.55 |
| 1934X | 53 | 24 | 45.28 | | | | | | | | |
| Totals* | 3346 | 236 | 7.06 | 3 | 1.23 | 141 | 54.23 | 63 | 24.23 | 53 | 20.38 |

*1934X not included in first three columns because of possible influence due to special matings. All percentages in the age incidence section are based on 260 cases which include 1934X.



TABLE IV—*Differences in the incidence of birds with pendulous crops among the progeny of males.*

| YEAR | TURKEYS ALIVE AT 12 WEEKS | TURKEYS WITH PENDULOUS CROP | | LOW-INCIDENCE GROUPS | | | | HIGH-INCIDENCE GROUPS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SIRES | TOTAL PROGENY | PROGENY WITH PENDULOUS CROP | | SIRES | TOTAL PROGENY | PROGENY WITH PENDULOUS CROP | |
| | | No. | % | | | No. | % | | | No. | % |
| 1932 | 996 | 55 | 5.52 | 5 | 642 | 22 | 3.43 | 2 | 354 | 33 | 9.32 |
| 1933 | 981 | 38 | 3.88 | 6 | 842 | 15 | 1.78 | 1 | 139 | 23 | 16.55 |
| 1934 | 1369 | 143 | 10.44 | 8 | 1066 | 71 | 6.66 | 2 | 303 | 72 | 23.76 |
| 1934X | 53 | 24 | 45.28 | | | | | | | | |

developed pendulous crops. Of these five, three later recovered, whereas none of the 19 other pendulous-crop progeny of the same male and the pendulous-crop females recovered.

The two males that produced the largest proportion of progeny with pendulous crops in 1934 were brothers of the females with pendulous crops (T-408 and T-410 in the special mating), and all were from the male (TM-135) that produced most of the cases found in 1933. This male (TM-135) was, in turn, from one of the high-incidence groups in 1932. The incidence in different families (the progeny of a single male and female) from matings of normal individuals in 1934 varied from none to nine affected individuals.

Until more data are available for different types of matings, it is obviously hazardous to suggest anything regarding the mode of inheritance. Furthermore, because of the evident effect of the environment, it is difficult to interpret the genetic evidence. In other words, the indications are that birds having the same genetic constitution may or may not develop a pendulous crop, depending on the environmental conditions. Whatever the exact mode of inheritance may prove to be, the significant differences in the incidence of pendulous crops in various family groups and the increased percentage of birds with pendulous crops from matings of birds with this condition do appear to furnish convincing evidence that hereditary factors play an important part in the occurrence of pendulous crops in this flock.

*Environment:* Environment appears to be second in importance to heredity, and weather is the most important environmental factor. It is a common observation among California turkey-growers that the incidence increases with the first excessive heat of the season, especially if it is accompanied by low humidity and a strong drying wind which causes the birds to drink large quantities of water. Practically all losses from the condition that have been reported to us have been confined to turkey-growing areas in the hot interior valleys. Reports from flock-owners living in the foothill and coast areas where heat waves last for only short periods of time indicate that when pendulous crops appear in these regions there is a high percentage of recoveries. That weather is an influencing factor is evident from the fact that in 1934, 102 (71.33 per cent) of the 143 cases were first recorded during or immediately following six heat waves that occurred during June, July and August. During these heat waves, the maximum temperatures ranged from 100° to 106° F. for each period lasting from three to eight days. With one or two exceptions, the prevailing wind for each

period was from the north, and the relative humidity ranged from 13 to 30. Such conditions induce the heavy liquid consumption which is probably responsible for the first visible appearance of the pendent crop.

In 1934, the data on the first appearance of pendulous crop were obtained by casual inspection of the flock at the time of feeding and watering and by individual handling of the birds once each month. In 1935, individual inspection was made more frequently, resulting in the discovery of more cases in the early stages. Though not complete, these 1935 data again indicate that the majority of cases make their first visible appearance during periods of excessive heat.

Other environmental factors that may prove by future investigation to have a bearing on the incidence of pendulous crop are: (1) type of ration, (2) amount of roughage available in the yards, and (3) the amount of shade in the yards. No definite data on these factors are now available.

*Age:* The ages at which pendulous crops first appear in a flock vary considerably, and, as already stated, weather conditions probably have some influence. A summary of the data collected on age incidences is included in table III. During the three seasons, 1932 to 1934, inclusive, 260 cases were observed. Of these, 141 (54.23 per cent) were first diagnosed in the 9- to 12-week age groups, and only three (1.23 per cent) were first seen previous to eight weeks of age. The fact that the poults were left in the brooder with yards having an abundance of shade until eight weeks of age may have influenced the number of cases during this time. In 1934, a larger percentage of the total cases appeared after 16 weeks, but the majority of them appeared before 20 weeks of age.

The results obtained to date in 1935 (August 1) indicate that the age incidence will be very similar to that of other years but with a much higher percentage in the 9- to 12-week age group. As mentioned under environment, the personal handling of the birds at frequent intervals in the 1935 trials may account for this. This is the result of more accurate records on slight distention that ordinarily would be missed by daily flock inspections until they had increased to a size easily seen without handling. The total incidence this year also is expected to be larger, due to the fact that one of the major purposes of the experiment flock has been to obtain data on the incidence of this condition in special matings made for that purpose.

Each year a few turkeys which have not previously been recorded as having pendulous crops develop them after being

placed in the breeding-pens. It is possible that these individuals may have shown a slight tendency that went unobserved during their first year. The majority of these cases have appeared during excessive heat waves, and have been temporary distentions that have disappeared within a few weeks.

## Prevention, Control and Treatment

Prevention of pendulous crops probably can be accomplished best by selection of resistant breeding stock. In pedigreed breeding flocks, it is a relatively easy matter to eliminate all families in which indications of pendulous crop have appeared. In the average commercial flock, however, selection is difficult because of lack of pedigree information. In these flocks some system of marking each bird that shows even a slight tendency to develop the condition is recommended. Such birds should not be kept for breeding purposes. Any other birds that are known to be related to them also should be eliminated. Many systems of marking turkeys are available and include painting, wing-banding, leg-banding and toe-marking. Painting a small area of the feathers on the back or neck with a quick-drying paint of a bright contrasting color is in common use and has the advantage over the other methods because it is easy to apply, cheap, and easily visible. A heavily painted spot two inches in diameter will last for two or three months. Wing-bands are preferred to leg-bands or toe-markers. The most suitable wing-band for marking a growing turkey is a sheep ear-tag of the clinch type which can be inserted in the edge of the wing web with a pair of special forceps. If put in properly, they can be seen without catching the birds, though not so readily as the paint.

Many methods for reducing the pendulous crop have been reported from the field, but, when tried in controlled experiments, most of them failed. Some of the methods used are fitted vests for holding the crops in place, limitation of liquid consumption by various methods, and crude surgical procedures. Since a fair percentage of the cases recover without treatment, much of the success attributed by turkey-growers to their procedures is due, no doubt, to natural recovery.

One of the most common surgical methods in use is to tie, and allow to slough off, a fold of skin over the bulbous portion of the crop. The reduced skin area is then a support for the crop. This method, if done early and followed by frequent drainage of the crop, is the most promising of any that has been tried.

The crop can be successfully and quickly washed with the aid of a stomach-pump, a large, thick-walled, rubber tubing, and a

glass tube. A heavy-walled, glass tube can be inserted and the rubber tubing should be put through it to force a mild antiseptic into the organ. When the crop is filled with the liquid, the hose can be pulled out, and the liquid will drain through the glass tube. In preparing a bird for a crop douche it is merely necessary to suspend it by the legs at a convenient working height.

Removal of the bulbous portion of the affected crop is an effective method of saving the patient, but it is too expensive for routine use. Twelve turkeys between eight and nine months of age with pendulous crops of several months standing were operated on just previous to the 1935 breeding season to obtain birds for our experimental matings. Three of them died during the operation. Two were found to be suffering from aspiration pneumonia with large proportions of caseated lung tissues, and the third was so emaciated that it was known to be a poor surgical risk. Of the nine that survived the operation, four died within three weeks from septicemia caused by leakage of crop contents into the area surrounding the crop, as a result of fistulas that developed along the line of incisions, or from impactions of the lower esophagus or from lobular pneumonia. The remaining five, consisting of four females and one male, are still alive after seven months and have been used in the breeding-pens. All have maintained a normal weight and have shown no apparent ill effects from the lack of a crop. Three of the females have laid an average of 39 eggs each, but the fourth has laid only two eggs. The number of eggs laid is considerably below the flock average but about the same as that for the pendulous crop cases that were not operated upon. The operated male has proved as potent a sire as any of the normal males used during the year.

In all of the operations, pentobarbital-sodium (Nembutal 844) was used to produce the primary anesthesia. Approximately 1 grain per kilogram of weight given intravenously was found to be a satisfactory dose, but it was necessary to have ether available for use toward the end of the operation. The details of the operative procedure will not be discussed here, for it was identical to that recommended for removal of diverticula involving mucous membranes. The thinness of the crop made it very difficult to obtain a complete closure of the organ without danger of leaving sections of mucous membrane exposed.

Treatment of cases of pendulous crops by the use of drugs has not been found to be successful. Draining the organ and douching it with antiseptic solutions at frequent intervals may be of

some value, but the time consumed soon devours the profits to be realized from the sale of the bird if it does recover.

## SUMMARY

Pendulous crop is an abnormality of the ingluvies characterized by a temporary or permanent distention with stagnant liquid or semi-liquid contents. The observations reported in this paper have been made principally on one flock where the yearly incidence was 5.52 per cent in 1932, 3.88 per cent in 1933, and 10.44 per cent in 1934.

In a group of 206 pendulous-crop turkeys kept under observation until maturity or death, 73 (35.44 per cent) recovered and remained normal. Of those that did not recover, 72 (34.95 per cent) died as a direct result of the condition, seven (3.39 per cent) died from miscellaneous causes, and 44 (21.36 per cent) were killed because of emaciation. The remaining ten (4.85 per cent) were killed at maturity as fit for market but were of poor quality. The common causes of death were ruptured crops caused by self-incurred lacerations, injury by pen mates, and mechanical pneumonia. The chief autopsy findings in advanced cases were distention with liquid or semi-liquid contents of a sour, acrid, or fetid odor, a thickening of the mucous membrane with varying degrees of ulceration, and, in a small percentage, caseation of all or portions of the lungs and air-sacs with definite evidence of foreign material in the bronchi.

Several factors appear to influence the incidence in a flock. Heredity is probably the most important of these, but the indications are that birds having the same genetic constitution may or may not develop the abnormality, depending on certain environmental conditions. Most of the cases that have been observed have appeared when the poults were between nine and twelve weeks of age, and have been associated with excessive liquid consumption during heat waves that were accompanied by extremely low humidity.

Methods of control and treatment have included daily draining of the crops, washing the crops with weak antiseptics at daily intervals, portioning of drinking water after drainage, and various operative procedures, but they have not greatly influenced the number of recoveries. Removal of most of the bulbous portion of the crop has proved a successful means of correcting the condition in birds that are to be kept for experimental breeding purposes, but the mortality following such procedure has approximated 50 per cent.

Selection of resistant breeding stock appears to be the logical means of prevention.

# OBSERVATIONS ON CERTAIN UNIDENTIFIED ACID-FAST BACTERIA OBTAINED FROM CATTLE*

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Recently Branch,[1] in studying a group of acid-fast microörganisms other than the mammalian forms of *Mycobacterium tuberculosis*, that had been isolated from various lesions of human beings, found that the intraperitoneal injection of white mice proved a useful aid in differentiating acid-fast bacteria that were neither true tubercle bacilli nor absolute saprophytes. These strains, which may represent hitherto unidentified or new strains of mycobacteria, when injected intraperitoneally into white mice, induced multiple abscesses in the kidneys. Real tubercle bacilli or true saprophytes did not provoke such lesions.

For the purpose of studying the behavior *in vivo* of certain strains of acid-fast bacteria that had been obtained from cattle that were devoid of the lesions of genuine bovine tuberculosis, a series of white mice were inoculated intraperitoneally with saline suspensions prepared from eight different strains of bacteria. Seven of these strains were definitely and consistently acid-fast, while in one this character was inconstant, as is noted later.

The bacterial cultures used consisted of *M. tuberculosis (bovis)* and *M. tuberculosis (hominis)*, one strain each; *M. tuberculosis (avium)*, two strains; *Mycobacterium phlei* (timothy grass bacillus), one strain; cultures isolated from tuberculoid lesions (so-called "skin lesion") of cattle, two strains, and one strain obtained from a mesenteric lymph-node of a cow.

## NOTES ON THE ORIGIN AND CHARACTER OF THE RESPECTIVE BACTERIAL CULTURES

Strain 1390, isolated in 1933, from a caseous lesion in a bronchial lymphnode of a cow that had reacted to tuberculin. The cultural behavior of the organism and its pathogenicity for guinea pigs and rabbits revealed the characteristics of *M. tuberculosis (bovis)*.

Strain 2047, isolated in 1933, from the spleen of a guinea pig that had been previously inoculated with material from a human being affected with extrapulmonary tuberculosis. The culture was subsequently typed by pathogenicity tests and found to possess the characteristics of the human form of *M. tuberculosis*.

*Received for publication, August 10, 1935.

Strain 14, isolated in 1934, from the spleen of a chicken infected spontaneously with tuberculosis. Subsequent injections into rabbits and chickens induced marked and extensive tuberculosis, attesting to the virulence of this strain.

Strain 518, isolated in 1929, from the liver of a chicken affected with spontaneous tuberculosis. At the time of isolation the organism possessed moderate virulence for chickens but only slight virulence for rabbits. During the past five years, the degree of virulence for both rabbits and chickens has remained about the same; the resultant disease is of a chronic, slowly progressive character with the injected animals living indefinitely.

*M. phlei* (timothy grass bacillus) obtained from Dr. Esmond R. Long in 1931.

Daines strain 24-o-30. Subculture obtained from Dr. L. L. Daines, University of Utah, in 1931. The organism, which is acid-fast, was obtained by Dr. Daines from a so-called "skin lesion" of a bovine and was considered representative of those organisms belonging to group 3 in Daines and Austin's[2] classification.

Daines strain 38-o-30. This organism was also isolated by Dr. Daines from a so-called skin lesion of a bovine and was considered characteristic of those organisms belonging to type 2 in the grouping proposed by Daines and Austin for the bacteria isolated by them from these lesions. This organism is frequently pleomorphic with diphtheroid forms not uncommon. Acid-fastness is an inconstant feature and apparently is dependent on the constituents of the media in which the organism is cultured and to some extent on the age of the culture. It is usually chromogenic.

The acid-fast bacteria isolated by Daines and Austin[3] and considered by them as belonging to group 3 of their classification have proved innocuous for rabbits and chickens although revealing, according to Daines and Austin,[3] a limited pathogenicity for guinea pigs, rats, mice and cattle. In a few instances comparable results were obtained experimentally following the injection of bacteria belonging to their group 2. Daines and Austin[4] believed (1) in the existence of an etiologic relationship between the group 3 organism, the tuberculoid lesion of cattle, and (2) that the organisms of group 2 and of group 3 represented different developmental stages of the same bacterium and (3) that these organisms are not *M. tuberculosis*.

Hastings' strain GH, an acid-fast bacterium isolated in 1927, by Dr. E. G. Hastings, University of Wisconsin.[5] The organism was obtained from a mesenteric lymph-node of a young cow which had failed to react to tuberculin. Production of lesions in rab-

bits, guinea pigs, or chickens by this organism has never been observed. In an experiment previously reported chickens injected intratracheally or intravenously with this organism eventually developed a sensitivity to both avian and mammalian tuberculin although lesions were not demonstrable.[6]

## Methods

*Animal inoculations:* Each strain of bacteria was used to inject a series of six adult male white mice. The suspensions used were prepared from subcultures five to six weeks old. The suspensions had a turbidity slightly greater than tube 10 of the MacFarland nephelometer and each mouse received 0.25 cc of bacterial suspension intraperitoneally.

Portions of the same suspensions used to inject the mice were used also to inoculate a series of rabbits. Each bacterial suspension was used to inject two rabbits, intravenously, the amount of the inoculum being 1 cc.

With the exception of six mice that died in from two to 41 days after the date of inoculation all mice were killed 94 days after being injected. The majority of the rabbits died between two and twelve weeks after the experiments had begun. The results of the inoculation of the rabbits revealed quite definitely that there existed a marked difference in the pathogenic propensities of the various bacterial cultures inoculated. The bacteria obtained in genuine cases of tuberculosis and considered as *M. tuberculosis* induced morbid changes in practically every animal, while no lesions were demonstrable in the eight rabbits injected with the four other cultures under investigation.

## Attempts to Recover the Respective Bacterial Strains

At the time of necropsy, portions of the spleens of all of the mice, with the exception of five animals, four of which died within one week after receiving the bacterial suspensions, were emulsified for the making of cultures. One cc of the respective splenic emulsions was treated with 5 per cent oxalic acid and eventually used to inoculate four tubes of Herrold's egg-yolk-agar medium. Cultures of acid-fast bacteria were obtained from each of the splenic emulsions prepared from the mice in the four groups that had previously been inoculated with bovine, human and avian varieties of *M. tuberculosis.* In no instance, however, were positive cultures obtained from the spleens of the mice injected with the other microörganisms (table I).

Supplementary studies on the resistance of the Daines-Austin type 2 and type 3 bacterial strains to 5 per cent oxalic acid and 3

per cent sodium hydroxide revealed that suspensions of these bacteria were rendered nonculturable when subsequently seeded on media similar to that inoculated with the splenic emulsions. These bacteria are therefore nonresistant to reagents which have a minimal, if any, effect on the bacteria of true tuberculosis.*

TABLE I—*Results of attempts to isolate by cultural means various forms of acid-free bacteria from the spleens of previously inoculated mice.*

| BACTERIUM | TISSUES WITH LESIONS OF TUBERCULOSIS* | SPLEENS CULTURED | CULTURES | | BACTERIAL COLONIES PER TUBE |
|---|---|---|---|---|---|
| | | | POS. | NEG. | |
| *M. tuberculosis (bovis)* | Spleen; renal lymph-node | 4 | 4 | 0 | 1 to 2 |
| *M. tuberculosis (hominis)* | Lungs; inguinal lymph-node | 4 | 4 | 0 | Not more than 12 |
| *M. tuberculosis (avium)* 14 | Lungs, liver, spleen, renal lymph-node | 6 | 6 | 0 | Innumerable |
| *M. tuberculosis (avium)* 518 | None | 5 | 5 | 0 | Not more than 12 |
| *M. phlei* | None | 6 | 0 | 6 | None |
| Daines-Austin, type 2 | None | 6 | 0 | 6 | None |
| Daines-Austin, type 3 | None | 6 | 0 | 6 | None |
| Hastings' GH | None | 6 | 0 | 6 | None |

*Lesions when present usually occurred in but one or two mice in the respective groups. Only in the group of animals inoculated with *Mycobacterium tuberculosis (avium)* 14, were lesions found in all of the mice.

In this regard it is of interest to note that Corper and Uyei[7] found a 3 per cent solution of hydrochloric acid and a 2 per cent solution of sodium hydroxide to be highly toxic to a large number of nonpathogenic acid-fast bacteria. These workers also found 5 per cent solutions of oxalic acid toxic to several of the strains studied, particularly in those suspensions containing a very small number of bacteria.

As might be expected, the largest number of colonies and the most luxuriant growth occurred on the media inoculated with the splenic emulsions prepared from those mice previously injected with *M. tuberculosis (avium)* strain 14. The spleens from the mice injected with organisms of bovine tuberculosis yielded fewer colonies than the material containing the organisms of human tuberculosis. It was of some interest to note the marked contrast in the recoverability of the two strains of *M. tuberculosis (avium)*. While innumerable colonies occurred on each slant

*Subsequent observations indicate that Hastings' strain GH, while markedly resistant to a solution of 3 per cent sodium hydroxide, is less so to 5 per cent oxalic acid solution.

of medium inoculated with the respective splenic emulsions prepared from the mice injected with strain 14, a relatively small number of bacterial colonies appeared on the medium inoculated with material from the spleens of the mice previously injected with strain 518. These results were consistent with the degree of pathogenicity exhibited by these two strains of *M. tuberculosis* (*avium*) strain 14, possessing virulence to a considerable degree, while strain 518 failed to provoke demonstrable lesions in the inoculated mice.

## Morbid Anatomy

Each mouse was examined immediately after death and the presence of gross lesions was noted. Regardless of the presence of lesions, tissues were secured from the lungs, liver, spleen and kidneys, and from lymph-nodes that appeared to be enlarged. Sections were prepared in duplicate from each. One section was stained with hematoxylin and eosin and the other with carbol-fuchsin-hematoxylin for the purpose of disclosing the presence of acid-fast bacteria.

The only gross lesions of a tuberculous character observed occurred in a few mice in each group that had been injected with *M. tuberculosis* (*bovis*) or *M. tuberculosis* (*hominis*), or avian strain 14. None of these cultures, however, induced extensive or generalized tuberculosis. Small, focal, macroscopic lesions were found in the lungs of two mice, one of which had been inoculated with the bovine form of *M. tuberculosis* and one with the human variety. The spleens of several mice were enlarged but in only one instance did a lesion of macroscopic dimensions occur. This was in the spleen of a mouse injected with avian strain 14. In two instances mice injected with the organism of bovine tuberculosis developed extranephric lesions that were later found to represent involved renal lymph-nodes.

As one might expect, more lesions were demonstrable microscopically than were seen grossly.* This was particularly true of the mice injected with the bovine and human forms of *M. tuberculosis*. These lesions were characterized by the presence of a thick, capsular periphery with central caseous necrosis, the necrotic débris containing enormous numbers of acid-fast bacteria.

The lesions induced by avian strain 14 were usually small and atrophic in character, with epithelioid cells predominating. These lesions frequently contained acid-fast bacteria in such large numbers that the clumps could be seen under the low power of the microscope. Necrosis was not observed.

*Only those lesions in which acid-fast bacillary forms could be demonstrated were considered as tuberculous.

No microscopic evidence of disease was observed in the tissues of any of the mice inoculated with *M. phlei* or with the two cultures obtained from Daines. The kidneys of five of the six mice injected with Hastings' strain GH showed interstitial cellular reactions which were largely of a histiocytic character. In no instance did formation of tubercles or abscesses occur, and acid-fast organisms were not observed. The significance of these changes is not apparent, although the fact that the kidneys of two of these mice showed infestation with *Klossiella muris* seems worthy of consideration. None of the nephric lesions observed resembled those described by Branch as occurring in the kidneys of mice injected with certain acid-fast bacteria that were neither true tubercle bacilli nor absolute saprophytes.

## Comment

There is little evidence that any of the four strains of bacteria other than the true tubercle bacilli possessed even slight pathogenicity for mice. The Daines-Austin strains behaved not unlike *M. phlei* and the reaction in mice following the injection of the Hastings strain GH was hardly sufficient to determine definitely the true character of this organism. My observations indicate, however, that this organism is dissimilar in certain respects to those isolated by Daines and Austin.[2] That chickens injected with the organism developed a sensitivity to tuberculin seems not without significance.[7]

Recoverability from tissues of injected animals seems to be one of the characteristics of true *M. tuberculosis*. This fact was apparent in the cultures obtained from the spleens of the mice inoculated with avian strain 518. This organism, which at present possesses a slight or limited virulence for chickens, failed to cause either gross or microscopic lesions in the respective mice, yet splenic emulsions yielded positive cultures in each of the four instances in which cultures were attempted.

Whether the bacteria under investigation may eventually be proved to represent hitherto unidentified strains of tubercle bacilli of low or restricted virulence seems hardly likely. When considered by the criteria available for identifying true tubercle bacilli, one is forced to the conclusion that they have many of the characteristics of saprophytes. If they are to be considered significant in the pathogenesis of a given lesion, further information of a convincing character will be necessary.

## Summary and Conclusions

The observation having been made by Branch that the intraperitoneal injection of white mice with acid-fast bacteria, that

were neither true tubercle bacilli nor absolute saprophytes, was followed by the production of multiple abscesses in the kidneys, suggested the use of this procedure to determine the character of certain acid-fast bacteria that had been isolated from the tissues of cattle. The bacteria studied included strains representative of type 2 and type 3 isolated by Daines and Austin from so-called skin lesions of cattle; Hastings' strain GH; *Mycobacterium phlei* and *Mycobacterium tuberculosis (hominis)*, *M. tuberculosis (bovis)* and *M. tuberculosis (avium)*, two strains. The organisms of true tuberculosis, with the exception of one of the avian strains of low virulence, exhibited a pathogenicity for mice with the production of tubercles and large caseated tuberculous abscesses, and *M. tuberculosis* was recovered consistently from the spleens of the mice. The animals injected with the four other strains of bacteria studied failed to induce the nephric lesions observed by Branch. From the spleens of these mice it was not possible to recover the organisms previously injected.

These observations seem to indicate that the bacteria studied, other than those which originated from cases of true tuberculosis, possessed features in common with the saprophytic acid-fast organisms. While they possess certain cultural and other biologic differences, the failure to provoke convincing evidence of pathogenicity should make one cautious in subscribing to their etiologic significance in the spontaneous production of disease.

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A pullet on a farm near Keene, N. H., recently outdid herself when she laid an egg eight inches long and six and three-fourths inches wide.

# WHAT VETERINARIANS ARE DOING TODAY*

*By* J. C. FLYNN, *Kansas City, Mo.*
*President, American Veterinary Medical Association*

Good morning, my friends of the radio world. I welcome this opportunity to acquaint you with some of the things that the veterinarians of America are doing today.

Many people associate the word "veterinarian" with the old-time "horse doctor," who practiced with very little scientific training and, as far as actual knowledge of medicine and surgery was concerned, was little more than a stableman. Today your animals are cared for by a highly scientific, well-trained force of men who have to spend at least five years in intensive study of the diseases of all domestic animals. This training qualifies the veterinarian of today to pass on questions of public health in which diseases of animals communicable to man are concerned.

Such problems should not be left entirely to the medical profession, as is the case in so many communities. Every sanitary district or board of health should have as one of its members a well-qualified veterinarian. His knowledge and counsel will be invaluable in handling problems which arise in connection with diseases of animals that are communicable to man, including rabbit fever, parrot fever, undulant fever, rabies, tuberculosis, and scores of others which lack of time will not permit me to mention.

Public health is safeguarded by highly trained veterinarians in the United States Bureau of Animal Industry, insofar as the interstate shipment of meats and meat food products is concerned. The health of our soldiers also is protected by a corps of veterinarians in the U. S. Army, who see to it that the food-producing animals are sound and healthy, and that all food is pure and up to government specifications when it is purchased for our soldiers.

But the health of the general public in many localities is not under such favored protection and is badly neglected. Politics prevents such protection in many states, counties and cities throughout the country. It is the intention of the members of the American Veterinary Medical Association to put forth our best efforts to bring about better health regulations throughout the United States and to bring the standard of health in the small towns and rural districts up to that of the large cities. We

*Radio address broadcast from Station WREC, Memphis, Tenn., January 22, 1936, and from Station WCOC, Meridian, Miss., January 24, 1936.

believe that the life of a baby in a town of 300 is just as precious as the life of a baby in a city of 300,000.

Another thing that we plan to do is to try and eliminate from the racetracks of this country the unscrupulous individuals who dope race horses and resort to many inhumane methods to win or throw races, thereby putting into disrepute one of the great American sports, to say nothing of the inhumane treatment given our good and noble friend, the horse. We will work for strict regulations for the interstate shipment of dogs. Many states try to enforce such regulations, but do not receive federal coöperation. As a result, infectious and contagious diseases are being spread over our land. All of this should be corrected before necessity forces us to act. The question is one of vast economic importance.

If the public will go to the trouble to investigate, they will be surprised at the accomplishments of the veterinary profession during the last quarter of a century. Serious animal problems are being mastered. Diseases heretofore considered fatal are being successfully controlled or prevented. Hospitals for the care and treatment of small animals are just as well equipped and are operated on just as scientific a basis as are the hospitals for human beings. Whether you have a dog or a cat, a bird or any other pet animal, it makes no difference. Your veterinarian will treat it and it will be nursed just as well in his hospital as will your baby in a hospital for human beings.

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## Objects of National Dog Week

National Dog Week was conceived and its observance begun in 1928 by a group of impartial national sportsmen, headed by Will Judy, editor of *Dog World*, who felt the need of a more sensible relationship between man and his great animal friend, the dog. The objects of National Dog Week are:

1. A dog in every home.
2. A good home for every dog.
3. To educate dog-owners as to their obligations, both to their dogs and to the public generally.
4. To teach kindness and consideration by children and adults towards dogs and animals in general.
5. To emphasize the use of the dog as a home protector and faithful companion.
6. To secure fair and just laws for dogs and their owners.


# COMMON WARTS (PAPILLOMATA) IN GOATS*

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*Pathological Division*
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*Field Inspection Division*
*Bureau of Animal Industry, U. S. Department of Agriculture*

Common warts are frequently seen affecting both animals and man. They have been reported in dogs, cattle and horses. A case of warts on the udder of a goat was reported to the Pathological Division, Bureau of Animal Industry, Washington, D. C., in a letter from Lenox, California, in 1932.

It is generally agreed that the etiological factor in common warts is probably a filtrable virus. Creech[1] succeeded in producing the disease in cattle with wart filtrates. M'Fadyean and Hobday,[2] by experimental inoculations, reproduced warts in the mouths of dogs. Wile and Kingery[3] were successful in transmitting warts in several human beings with sterile filtrates of wart material. Shope[4] demonstrated that papillomatosis of wild rabbits is due to a filtrable virus and may be transmitted to both wild and domestic rabbits.

A review of the literature would indicate that the occurrence of warts in goats is rather rare. Through recent numerous inquiries of owners of goat flocks, as well as through our own observations and those of other veterinarians, we have not encountered or learned of any occurrence similar to that herein described as existing in goats.

## HISTORY

About two years ago, warts were first noticed on several animals in a herd of approximately 200 Saanan milk goats belonging to the Navajo Indian Agency at Crownpoint, New Mexico. The herd is divided into a milking lot and a dry lot, each consisting

*Received for publication, December 18, 1935.

of 100 animals. The milking animals are confined in a pen enclosure and are not in contact with the dry lot which are in pasture. The disease has progressed over the two-year period to the extent that nearly all of the milking goats are now affected. Among the dry-lot animals there are five goats that show warts. These animals were previously in the milking lot and have since been removed following cessation of the lactation period.

Animals in the dry lot, when placed in the milking lot following freshening, invariably contract the disease. There are only four male breeding goats in the herd, none of which shows vis-

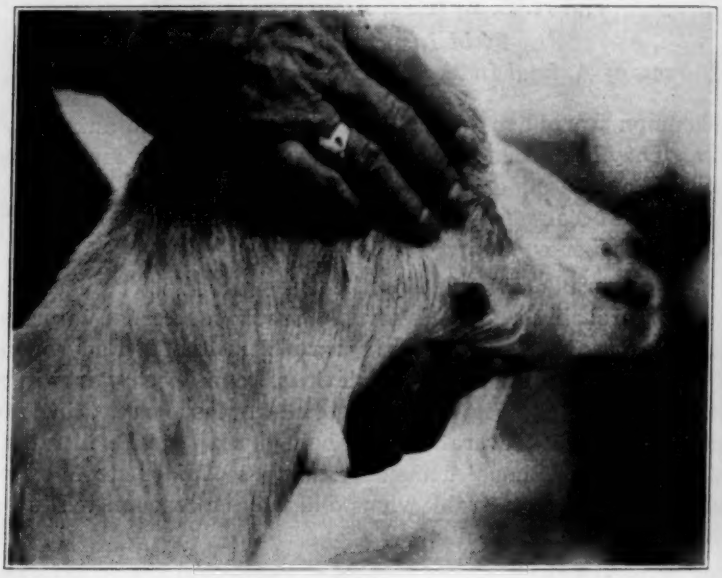

FIG. 1. Wart on face.

ible evidence of warts. These male goats are kept in a separate pen and are in contact with affected animals for only short intervals, as they are needed for breeding purposes. The warts are present principally on the head, neck, shoulders, and fore legs above the knees (figs. 1 and 2). No warts were observed on the udders or teats of any of the animals.

The number of warts varies from one to twelve. Affected goats range in age from two to eight years. At no time has there been any contact with cattle. There appears to be no evidence of warts on the hands of the present attendants or the caretaker.

Examination of the goats shows the presence of ectoparasites, principally blue lice (Hematopinus) and some few red lice (Trichodectes).

## Pathologic Findings

The growth (fig. 3) is composed of papillary projections consisting of fibrous cores covered by a layer of stratified squamous epithelium of variable depth. There is considerable fibrous tissue present in which blood-vessels are seen. There are areas of necrosis in the superficial portion of the tumor. The surface epithelium not obliterated by necrosis shows cornification. The

Fig. 2. Wart on point of shoulder.

pathologic picture is quite similar to papillomata or common warts in cattle (fig. 4).

## Discussion

The history of this herd gives no indication as to the probable source of the disease. Experiments indicate that warts can be transmitted from animal to animal in different species. In the absence of cattle contact, it is probable that either the infectious agent was introduced from other sources or that an affected goat was added to the herd. Whether or not the ectoparasites play a part in the spread of the disease in this herd is problematic.

Mechanical transmission from animal to animal or from one part of the body to another should be taken into consideration. Goats are quite playful and have a habit of butting each other. In this manner mechanical transmission is very possible, particularly in the foreparts of the body. The use of the curry-comb offers another possible means of mechanical transmission.

The manager of a large cattle ranch in Texas, where some of the cattle are affected with warts, makes the statement that in

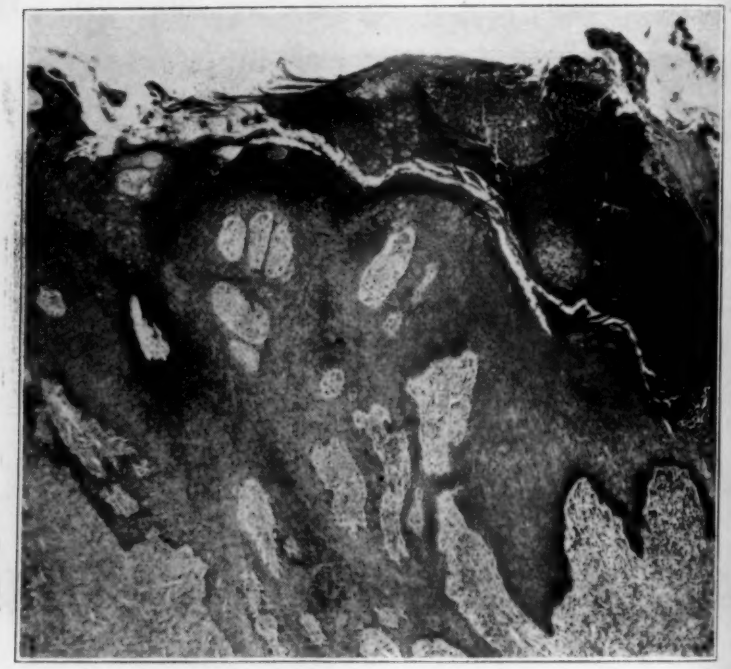

FIG. 3. Section from goat wart (x 40).

preparing cattle for show purposes the use of a sharp-toothed curry-comb is, in his opinion, responsible for the spread of the disease from affected to unaffected animals or from one part of the body to another. In our opinion, the close confinement with affected animals over a long period of time is an important factor in the spread of the disease. The animals in the dry lot that have not been previously confined in the milking lot show no visible evidence of warts. Also, the fact that the breeding males show no warts, although coming in contact with affected animals for

short intervals, tends to bear out this belief. The nature of the spread of the disease strongly suggests the infectiousness of warts in goats and the probability that the causative agent is a filtrable virus similar to that responsible for warts of other species of animals and man.

ACKNOWLEDGMENT

The writers wish to thank Dr. C. A. Curtis, of the New Mexico field office of the Bureau of Animal Industry, for his assistance in collecting material for sectioning, and the history of the herd.

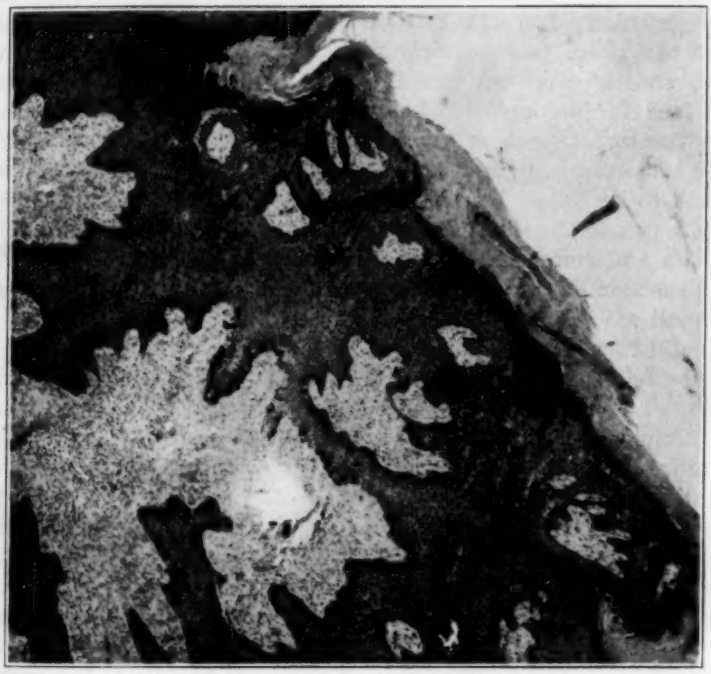

FIG. 4. Section from cattle wart (x 40).

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# TRAUMATIC SPLENITIS WITH POSTOPERATIVE PYEMIA*

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This case of traumatic splenitis occurred in a registered Holstein cow. She was born December 13, 1930, and dropped her first calf on August 8, 1933, and her second on October 22, 1934. Five months after the last calf was dropped, she became sick. The herdsman said the only time she was ever sick before was very shortly after she had her first calf. At that time she was off feed for a couple of days and apparently recovered without any treatment.

When examined during the last illness, the temperature was found to be 102.5° F., pulse 50, and respiration 28 to 30. There was a complete cessation of the milk flow, a partial atony of the rumen and complete anorexia. Constipation was marked. The mucous membranes were slightly congested. Upon palpation, only a small amount of pain could be produced just posterior to the xiphoid cartilage.

The following treatment was recommended: All feed was withheld. Two quarts of mineral oil, one ounce of aromatic spirits of ammonia and one grain of strychnine sulfate were given through the stomach-tube. The next morning her condition was unchanged. The animal was removed to the clinic, where she was prepared for an abdominal laparotomy. This was performed in the standing position under a combined caudal and local infiltration anesthesia. Upon opening the peritoneal cavity, an exploratory palpation was made. Numerous adhesions in the region of the reticulum and diaphragm were revealed. No attempt was made to break the adhesions. From this point on, the regular technic for the rumenotomy operation was carried to completion. Two pieces of baling wire, 6 to 7 cm long, and one flat stone, approximately 3 cm square, were removed; all three were free in the cavity of the reticulum.

For the first six days immediately following the operation, nothing out of the ordinary happened although the animal seemed somewhat sluggish and depressed. The appetite was fair, on the restricted diet she was receiving. On the seventh day, there was a slight discharge from the operative incision. Stitch infection had occurred and the sutures were removed from the skin

*Received for publication, January 9, 1936.

only. On the ninth day, the visible mucous membranes became markedly congested, and anorexia was complete. The eyes were sunken and a diarrhea occurred. The pulse, temperature and respirations indicated that a general septicemia had developed and the owners were advised that the cow would not recover. She died on the tenth day.

FIG. 1. The spleen divided longitudinally; then in turn, this half was divided approximately in the center and each piece placed side by side. In the upper right hand part may be seen a small section of reticulum. Level with it may be seen the three pieces of wire and stone which were placed on the exposed surfaces.

## AUTOPSY FINDINGS

A large abscess was located under the internal oblique muscle, in the region of the operative area. It extended upward and backward nearly to the external angle of the ilium. It contained approximately a quart of thin, greenish-yellow, fetid pus. The

parietal peritoneum had united in an apparently normal manner as well as the operative wound in the rumen. Only a very slight localized fibrinous peritonitis was present in these areas. A small localized area of a fibrino-purulent exudate was found on the

FIG. 2. A closer view of the upper right-hand part of figure 1. In this view the section of reticulum has been turned in order to show the exposed fistulous tract containing the baling wire.

anterior surface of the bladder. The remaining lesions found in the abdominal cavity were limited to the spleen, reticulum, liver and kidneys. The spleen was greatly enlarged, due to many chronic abscesses throughout the parenchyma. These extended

the capsule and caused bulging beyond the normal contour. The entire organ was closely adherent throughout its entire length to the diaphragm and it was with much difficulty that these adhesions could be broken down. By dissecting the tissue around the reticulum a small, cord-like mass was exposed which extended from this organ to the spleen. Upon opening it a small piece of baling wire, 6.5 cm long and pointed on each end, was found, one end of which projected into the splenic pulp for a distance of 2 cm.

Measurements of the spleen revealed the following: length, 64 cm; breadth, 24 cm; thickness, 9 cm. The weight was 4660 gms. Sisson gives the following dimensions for the spleen: 50 x 15 x 2 to 3 cm; weight, 900 gms.

The liver was studded, both on the surface and throughout the parenchyma, with multiple abscesses which were of uniform size and measured approximately 3 mm in diameter.

The kidneys were slightly enlarged. The capsules peeled with ease and exposed a light yellowish-brown-colored cortical surface that was covered with irregularly shaped, very dark red hemorrhages, intermingled with yellowish-white areas, which were also very irregular in outline. The cut surfaces bulged slightly and exposed a parenchyma in which there was no demarcation between cortex and medulla due to the extensive involvement by similar processes as seen on the surface. There were other areas where the involvement was only slight, but in practically no part was there an absence of gross pathological alteration.

The only gross lesions found in the thoracic cavity were a myocardial degeneration and numerous subepicardial petechiae.

### Microscopic Examination

Sections of various abdominal organs showed lesions common to all. They consisted of massive bacterial emboli, albuminous degeneration, necrosis, heavy polymorphonuclear infiltration, and suppuration.

The spleen showed a combination of lesions. The chronic ones seen in this organ upon gross examination naturally were prominent microscopically. In addition to these, there were many acute ones which corresponded to those seen in other organs.

In addition to the abdominal organs the lungs and heart also were examined. The lungs showed a slight purulent bronchitis, chronic passive congestion, emphysema and early pneumonic foci. In the heart there was a moderate infiltration of the myocardium

by polymorphs. This condition was in addition to the degeneration which was observed on gross examination.

This case of traumatic splenitis emphasizes the fact that in all cases there usually are some symptoms which manifest themselves at the time the initial injury is received. Proper attention then would often prevent more serious complications later on.

Rumenotomy apparently stirred up the chronic infection that was present, thus causing an acute exacerbation which resulted in an extreme pyemia. This rapid spread was brought about via the hematogenous route, as the spleen itself is so closely connected with it. The localization of such an amount of infection at the point of operation indicated that these tissues were devitalized by the surgical treatment.

Another point to be emphasized is the importance of a most thorough examination, both preoperative and during the operation. As complete a palpation as possible should be made of the peritoneal cavity before the rumen is incised. In this case the suspected area only was examined and as adhesions were felt, further exploration was not made.

With this case, and undoubtedly with many others, the foreign bodies that are found in the rumen and removed are usually not the ones that are causing the damage. The manipulation at the time of operation often seems to relieve the condition. In this particular case the wire which caused the perforation and adhesions was deeply imbedded and it would have been impossible to palpate and remove it by the hand in the reticulum.

Figures 1 and 2 show the conditions found on autopsy.

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## ANOTHER SPECIMEN OF DIOCTOPHYME RENALE

*By* E. E. PATTERSON, *Detroit, Mich.*

In connection with the report by Dr. W. H. Wright, on *Dioctophyme renale* in the dog, in a recent issue of the JOURNAL, I also wish to report a case. Some 18 months ago, I removed from the mammary gland of a Chesapeake Bay bitch, weighing between 80 and 90 pounds and coming from the Pacific Coast, a female specimen of *Dioctophyme renale*, measuring 29½ inches in length. We kept the worm alive for about ten minutes and it was a rather unusual sight to see this parasite lying upon the operating-table. It looked very much like a red, horse catheter. The bitch made a nice recovery. The operation was performed for Dr. E. J. Walters, of Wyandotte, Mich.


FURTHER OBSERVATIONS ON THE RELATION OF CERTAIN CARBOHYDRATES TO TRYPANOSOMA EQUIPERDUM METABOLISM. Hildrus A. Poindexter. Jour. Parasitol., xxi (1935), 4, p. 292.

Fermentable carbohydrates seem to play an important part in the rate of multiplication, survival time and virulence of trypanosomes. The decrease of blood sugar by insulin injection decreases the rate of multiplication of trypanosomes as shown by examination of blood taken from the peripheral circulation. Infected animals injected with insulin survived longer than similarly infected animals without insulin. There was a decrease in the dose of insulin required to produce a shock as the course of the infection progressed. This corresponded with the decrease in the amount of available fermentable carbohydrates in the blood and to the liver damage.

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COW'S MILK AS A POSSIBLE EXCRETORY SOURCE OF THE ANTERIOR PITUITARY-LIKE HORMONE. Abner Weisman, Israel S. Kleiner and Ezra Allen. Endocrin., xix (1935), 4, p. 395.

Milk from pregnant cows tested on mice by the Aschheim-Zondek method gave no evidence that the mammary secretion is the path of elimination of the anterior pituitary-like hormone in this animal.

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INVASION OF THE BODY TISSUES BY ORALLY INGESTED BACTERIA AND THE DEFENSIVE MECHANISM OF THE GASTROINTESTINAL TRACT. Lars F. Gulbrandsen. Amer. Jour. Hyg., xxii (1935), 2, p. 257.

Data are submitted indicating that bacteria are constantly invading the body tissue from the gastrointestinal tract. During their passage through the gastric and intestinal mucosae, however, an active dissociative change takes place in the invading bacterium which completely alters its morphology, staining properties, antigenicity and pathogenicity. This dissociative capacity is a part of the defensive mechanism of the gastrointestinal tract. The significance of these altered bacteria or tissue parasites in

body immunity and susceptibility to disease is being studied further.

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ABSENCE OF PATHOGENICITY IN CATS INFECTED WITH TRICHOMONAS FELIS FROM CATS AND TRICHOMONAS HOMINIS FROM MAN. Robert Hegner and Lydia Eskridge. Amer. Jour. Hyg., xxii (1935), 2, p. 322.

Infection by association of clean cats with cats infected with *Trichomonas felis* from cats and *Trichomonas hominis* from man was demonstrated. Eleven trichomonad-free cats were infected per os with a pure line of *T. hominis* from man. In every case a careful examination of the intestinal wall failed to reveal any lesions due to the presence of the trichomonads. *T. hominis* was eradicated from six cats by treatment with carbarsone (150 mg per kilo body weight per os daily for 5 days). Six kittens contracted *T. felis* infection when exposed artificially but no intestinal lesions were discovered three weeks later. The author concludes that, as none of the cats infected experimentally with trichomonads exhibited any pathologic effects, this infection is of little consequence in cats.

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TAPEWORM STUDIES. II. PERSISTENCE OF THE PASTURE STAGE OF MONIEZIA EXPANSA. Norman R. Stoll. Amer. Jour. Hyg., xxii (1935), 3, p. 683.

*Moniezia expansa* was able to overwinter in the field, withstanding two successive winters and the intervening seasons. Climatic factors and drouth conditions considerably affect viability. It has been demonstrated also that the infective stage is ingested on pasture and that the infective stage does not migrate from a pasture. During the years 1926-32 there is evidence of the tapeworm being ingested on pasture during each of the months except January. The question as to the limiting time infestation can be retained in a pasture without adding new infection is not yet answered. The author discussed the bearing of his experimental work on the eradication and life history of *Moniezia*.

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THE DISTRIBUTION OF SWINE INFLUENZA VIRUS IN SWINE. Marian L. Orcutt and Richard E. Shope. Jour. Exp. Med., lxii (1935), 6, p. 823.

Swine influenza virus was found to be regularly present in the turbinates, tracheal exudate and lungs of infected swine but not in the spleen, liver, kidneys, mesenteric lymph-nodes, colon mucosa, brain or blood. It was present in low concentration in the bron-

chial lymph-nodes of two out of eight animals. This localization of virus in swine accords with its classification as a pneumotropic virus. The virus evidently has a strong affinity for the respiratory tract and exerts its specific effect there. Those features of swine influenza, suggesting a generalized and septicemic infection, appear therefore to be secondary effects of the localized respiratory tract disease.

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THE EMIGRATION OF PNEUMOCOCCI TYPE III FROM THE BLOOD INTO THE THORACIC DUCT LYMPH OF RABBITS AND THE SURVIVAL OF THESE ORGANISMS IN THE LYMPH FOLLOWING INTRAVENOUS INJECTION OF SPECIFIC ANTISERUM. Cecil K. Drinker, John F. Enders, Morris F. Shaffer and Octa C. Leigh. Jour. Exp. Med., lxii (1935), 6, p. 849.

Rabbits injected intravenously with a large dose of virulent type III pneumococcus develop a bacteremia and within an hour organisms may be cultivated from the thoracic duct lymph. The rapidity with which entrance into the lymph occurs appears to be correlated with the size of the dose injected. The organisms may become more numerous in the lymph than in the blood. If homologous or heterologous antisera are injected, the blood may be sterilized, but though the organisms may be lessened in the lymph, sterilization at least within four hours is not secured, and in the intact animal living organisms must continue to enter the thoracic duct lymph. In infected rabbits after intravenous injection of considerable quantities of antisera containing moderate amounts of agglutinin, no antibody appears in the thoracic duct lymph although the presence of horse serum may be detected. The injection of a very large quantity of antiserum containing a high titre of agglutinin is followed by the penetration of antibody into the lymph. This, however, has failed to sterilize the lymph or to affect permanently the rate of multiplication of the pneumococci.

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OBSERVATIONS ON THE GESTATION PERIOD OF THE RABBIT. Paul D. Rosahn, Harry S. N. Greene and Ch'uan-K'uei Hu. Jour. Exp. Zoöl., lxxii (1935), 1, p. 195.

An analysis was made of the duration of 569 pregnancies in 305 purebred rabbits representing eleven breeds and 688 pregnancies in 411 hybrid rabbits. Gestation periods between the extremes of 29.1 days and 33.6 days are normal, while shorter or longer gestation periods should be considered abnormal. Diet, breed, body weight of the doe, and the male parent are factors found to influence significantly the length of gestation periods.

body immunity and susceptibility to disease is being studied further.

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ABSENCE OF PATHOGENICITY IN CATS INFECTED WITH TRICHOMONAS FELIS FROM CATS AND TRICHOMONAS HOMINIS FROM MAN. Robert Hegner and Lydia Eskridge. Amer. Jour. Hyg., xxii (1935), 2, p. 322.

Infection by association of clean cats with cats infected with *Trichomonas felis* from cats and *Trichomonas hominis* from man was demonstrated. Eleven trichomonad-free cats were infected per os with a pure line of *T. hominis* from man. In every case a careful examination of the intestinal wall failed to reveal any lesions due to the presence of the trichomonads. *T. hominis* was eradicated from six cats by treatment with carbarsone (150 mg per kilo body weight per os daily for 5 days). Six kittens contracted *T. felis* infection when exposed artificially but no intestinal lesions were discovered three weeks later. The author concludes that, as none of the cats infected experimentally with trichomonads exhibited any pathologic effects, this infection is of little consequence in cats.

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TAPEWORM STUDIES. II. PERSISTENCE OF THE PASTURE STAGE OF MONIEZIA EXPANSA. Norman R. Stoll. Amer. Jour. Hyg., xxii (1935), 3, p. 683.

*Moniezia expansa* was able to overwinter in the field, withstanding two successive winters and the intervening seasons. Climatic factors and drouth conditions considerably affect viability. It has been demonstrated also that the infective stage is ingested on pasture and that the infective stage does not migrate from a pasture. During the years 1926-32 there is evidence of the tapeworm being ingested on pasture during each of the months except January. The question as to the limiting time infestation can be retained in a pasture without adding new infection is not yet answered. The author discussed the bearing of his experimental work on the eradication and life history of *Moniezia*.

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THE DISTRIBUTION OF SWINE INFLUENZA VIRUS IN SWINE. Marian L. Orcutt and Richard E. Shope. Jour. Exp. Med., lxii (1935), 6, p. 823.

Swine influenza virus was found to be regularly present in the turbinates, tracheal exudate and lungs of infected swine but not in the spleen, liver, kidneys, mesenteric lymph-nodes, colon mucosa, brain or blood. It was present in low concentration in the bron-

chial lymph-nodes of two out of eight animals. This localization of virus in swine accords with its classification as a pneumotropic virus. The virus evidently has a strong affinity for the respiratory tract and exerts its specific effect there. Those features of swine influenza, suggesting a generalized and septicemic infection, appear therefore to be secondary effects of the localized respiratory tract disease.

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THE EMIGRATION OF PNEUMOCOCCI TYPE III FROM THE BLOOD INTO THE THORACIC DUCT LYMPH OF RABBITS AND THE SURVIVAL OF THESE ORGANISMS IN THE LYMPH FOLLOWING INTRAVENOUS INJECTION OF SPECIFIC ANTISERUM. Cecil K. Drinker, John F. Enders, Morris F. Shaffer and Octa C. Leigh. Jour. Exp. Med., lxii (1935), 6, p. 849.

Rabbits injected intravenously with a large dose of virulent type III pneumococcus develop a bacteremia and within an hour organisms may be cultivated from the thoracic duct lymph. The rapidity with which entrance into the lymph occurs appears to be correlated with the size of the dose injected. The organisms may become more numerous in the lymph than in the blood. If homologous or heterologous antisera are injected, the blood may be sterilized, but though the organisms may be lessened in the lymph, sterilization at least within four hours is not secured, and in the intact animal living organisms must continue to enter the thoracic duct lymph. In infected rabbits after intravenous injection of considerable quantities of antisera containing moderate amounts of agglutinin, no antibody appears in the thoracic duct lymph although the presence of horse serum may be detected. The injection of a very large quantity of antiserum containing a high titre of agglutinin is followed by the penetration of antibody into the lymph. This, however, has failed to sterilize the lymph or to affect permanently the rate of multiplication of the pneumococci.

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OBSERVATIONS ON THE GESTATION PERIOD OF THE RABBIT. Paul D. Rosahn, Harry S. N. Greene and Ch'uan-K'uei Hu. Jour. Exp. Zoöl., lxxii (1935), 1, p. 195.

An analysis was made of the duration of 569 pregnancies in 305 purebred rabbits representing eleven breeds and 688 pregnancies in 411 hybrid rabbits. Gestation periods between the extremes of 29.1 days and 33.6 days are normal, while shorter or longer gestation periods should be considered abnormal. Diet, breed, body weight of the doe, and the male parent are factors found to influence significantly the length of gestation periods.

Seasonal factors, age of the doe, and repeated pregnancies were found to have no significant influence on the gestation period.

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THE SIGNIFICANCE OF THE CELLULAR VARIATIONS OCCURRING IN NORMAL SYNOVIAL FLUID. Charles F. Warren, Granville A. Bennett and Walter Bauer. Amer. Jour. Path., xi (1935), 6, p. 953.

The synovial fluid from the astragalotibial and carpometacarpal joints of young beef cattle showed variations in the total number of nucleated cells and in individual cell types. The widest variations in cell types were observed in the astragalotibial joint fluids. The phagocytic cells averaged 57 per cent in the astragalotibial fluid and 74 to 78 per cent in the carpometacarpal joint fluid. The variation is explained by the increased amount of débris in the carpometacarpal joint resulting from the articular cartilage defects present. Evidently irritations, such as minor trauma, wear and tear, and so forth, are sufficient to increase the total number of nucleated cells and the percentage of phagocytic cells exclusive of polymorphonuclear leukocytes. The total number of nucleated cells contained in synovial fluid may increase postmortem, but there is very little change in the individual cell percentages. The cellular constituents of normal synovial fluid are not influenced by variations of the blood cytology. There is a definite species difference in the total number of nucleated cells and the percentage of individual cell types contained in normal synovial fluid.

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A SEROLOGICAL VARIANT OF SALMONELLA AERTRYCKE ISOLATED FROM PIGEONS. Philip R. Edwards. Jour. Bact., xxx (1935), 5, p. 465.

A serological variant of *Salmonella aertrycke* was isolated from pigeons in three widely separated communities. It differs from *S. aertrycke* in that it possesses somatic antigens identical with those of *Salmonella abortus-equi*. Some strains of the variant fail to ferment maltose and all give a negative Bitter test. The term *Salmonella aertrycke* var. Storrs is proposed to designate this type.

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STUDIES OF THE CULTURAL CHARACTERISTICS OF PASTEURELLA TULARENSE. Cora M. Downs and Glenn C. Bond. Jour. Bact., xxx (1935), 5, p. 485.

Twenty-one strains of *Pasteurella tularense* were found to ferment glucose and glycerol. Most of the strains also fermented mannose, levulose and maltose. All strains failed to ferment gal-

actose, lactose, sucrose, raffinose, melizitose, arabinose, rhamnose, xylose, mannitol, dulcitol, sorbitol and salicin. *P. tularense* produces an alkaline reaction in media not containing a utilizable carbohydrate, but in the presence of a utilizable carbohydrate it produces an initial acidity followed by an alkaline reaction. *P. tularense* produces hydrogen sulfide in media containing cystine, *P. tularense* is apparently unable to produce hydrogen sulfide in detectable amounts from media containing peptone and blood or serum. *P. tularense* does not produce hydrogen sulfide in detectable amounts from sodium thiosulfate. The addition of a number of sulfur-containing compounds failed to stimulate the growth of *P. tularense* but in the presence of these compounds there was no inhibition of the usual stimulative effect of cystine.

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INTESTINAL FLORA OF MONKEYS AND DOGS DURING DIGESTION AND FOLLOWING THE DIRECT INTRODUCTION OF FOOD SUBSTANCES INTO THE CECUM AND INTO ISOLATED SEGMENTS OF THE BOWEL. Elizabeth Petran. Jour. Inf. Dis., lvii (1935), 3, p. 296.

Attempts were made to alter the relationships of bacteria in the colon and in isolated segments of the large intestine by changing the nutritional environment. Four dogs and four monkeys were used in the study. The bacterial relationships in the ascending colon of dogs and monkeys were constant and were not appreciably altered during the digestive period by the incoming material from the small intestine. The intracecal injection of dextrose, lactose, peptone and bile was without noticeable effect on the numbers and relationships of organisms present in the colon. Feeding an exclusive liver diet to two monkeys caused a great increase in the number of sporulating anaerobes in the intestinal contents of one of the animals. The oral administration of lactose markedly stimulated the growth of *L. acidophilus* in the large intestine of the monkeys. The exclusion of bile from the intestine of a dog did not affect the flora of the large bowel. The flora of isolated segments of the colon in two monkeys was not significantly changed by the injection of bread and milk or lactose into the segments.

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A MALARIAL PARASITE INFECTING ALL BLOOD AND BLOOD-FORMING CELLS OF BIRDS. Clay G. Huff and William Bloom. Jour. Inf. Dis., lvii (1935), 3, p. 315.

*Plasmodium elongatum* has a daily cycle with the peak of segmentation occurring between 8 and 10 A. M. In contrast to other malarias, this parasite is capable of living in all blood and blood-

forming cells of the canary, including granular leukocytes. Although all of the asexual stages are found in all of the blood and blood-forming cells, the vast majority occur in cells of the erythrocyte series; the gametocytes are found only in normoblasts and erythrocytes. Only the parasites in cells with obvious hemoglobin produce pigment. The elongate merozoites of this plasmodium resemble those of the coccidia. Female canaries were used in this experimental work.

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CORNEAL REACTIONS OF NORMAL AND TUBERCULOUS GUINEA PIGS TO TUBERCULO-PROTEIN AND TUBERCULO-PHOSPHATIDE. Sion W. Holley. Amer. Jour. Path., xi (1935), 6, p. 637.

Tuberculo-protein had a markedly toxic action on the connective tissue of corneas of tuberculous animals and led to inflammation and partial degeneration (tuberculin reaction). It seemed responsible, possibly indirectly, for the production of epithelioid cells in the later stages of the allergic reactions. In the amounts used, the protein was practically inert in normal guinea pigs. Tuberculo-phosphatides also caused an acute tuberculin-like reaction in tuberculous guinea pigs but this may have been due to a tuberculo-protein impurity. In the former case the acute reaction was diffuse while in the case of tuberculo-phosphatide it was localized. In the latter case epithelioid cells were present at the later periods and persisted longer than did those in most of the tuberculo-protein reactions. In tuberculosis of the cornea most mononuclears taking part in the reactions at the site of injection came from the blood-stream and the epithelioid cells arose from those mononuclears by a process of transition at the site of inflammation.

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ALLANTOIN, A CONSTITUENT OF MAGGOT EXCRETIONS, STIMULATES HEALING OF CHRONIC DISCHARGING WOUNDS. William Robinson. Jour. Parasitol., xxi (1935), 5, p. 354.

A substance has been isolated from maggot excretions which has the property of stimulating healing in infected wounds. This substance, allantoin, is a product of metabolism of the cell nucleus of both plants and animals. The excretion of this substance into the wound is apparently one of the factors contributing to the remarkable healing effects obtained in maggot therapy; but the claim is not made that allantoin can be substituted entirely for the use of maggots. Allantoin is of common occurrence and can be obtained commercially. It is harmless and soothing and has no taste or odor. Treatment of wounds with the material is simple, painless and inexpensive.

## PUBLICATIONS RECEIVED

New York State Veterinary College, Cornell University. Report for 1933-34. (Albany, N. Y., 1935. pp. 152.)

Diseases of Animals Acts for the Year 1934, Report of Proceedings Under the. Ministry of Agriculture and Fisheries. (H. M. Stationery Office, London, 1935. pp. 90. Price, 1 s. 6 d.)

Texas, Agricultural and Mechanical College of. Bulletin of Information. (College Station, Tex., 1935. pp. 67.)

Veterinary Director General for the year ending March 31, 1935, Report of the. Can. Dept. of Agr. (Ottawa, 1935. pp. 77.)

Kansas Veterinary Medical Association. Proceedings of the. Topeka, Kan., Jan. 16-17, 1935. pp. 65.

The Occurrence of Bovine Babesiellosis in Northern Australia. J. Legg. (Bul. 56. Council for Scientific and Industrial Research, Melbourne, 1935. pp. 48. Illus.)

Iowa State College of Agriculture and Mechanic Arts. Division of Veterinary Medicine, Announcements, 1935-1936. (Ames, Iowa, 1935. pp. 82.)

The Resistance of the Virus of Infectious Laryngotracheitis to Certain Physical and Chemical Factors. O. W. Schalm and J. R. Beach. Reprint from *Jour. Inf. Dis.*, lvi (1935), pp. 210-223.

Contagious Bovine Pleuro-Pneumonia. Note on Experimental Reproduction and Infection by Contact. R. Daubney. Reprint from *Jour. Comp. Path. & Therap.*, lxviii (1935), pp. 83-96.

Los Angeles Live Stock Department. Eleventh Annual Report, for the year ending June 30, 1935. Leslie M. Hurt. pp. 40.

The Etiology of Fowl Paralysis, Leukemia and Allied Conditions in Animals. I. Introduction. History and a Bacterial Theory of the Etiology of These Diseases. II. The Intravenous Injection of Suspensions of *Salmonella aertrycke* in the Chicken. M. W. Emmel. Bul. 284. Univ. Fla. Agr. Exp. Sta., Gainesville, Fla., 1935. pp. 59.)

The Eskimo Dogs of the Eastern Arctic. S. Hadwen. Reprint from *The Beaver Magazine*, June and Sept., 1935. pp. 8.

Eliminating Bats from Buildings. James Silver. (Leaflet 109. U. S. Dept. of Agr., Washington, D. C., 1935. pp. 5. Price, 5c.)

The Survival of the Virus of Infectious Laryngotracheitis in the Bursa of Fabricious and Cloaca of Chickens after "Intrabursal" Injection. J. R. Beach. Reprint from *Jour. Inf. Dis.*, lvii (1935), pp. 133-135.

Some Studies of Infectious Laryngotracheitis. C. A. Brandly. Reprint from *Jour. Inf. Dis.*, lvii (1935), pp. 201-206.

Food Habits of the Coyote in Jackson Hole, Wyo. Olaus J. Murie. Cir. 362. U. S. Dept. of Agr., Washington, D. C., 1935. pp. 24. Price, 5c.)

Game Laws for the Season 1935-36. H. P. Sheldon and Frank G. Grimes. (Farmers' Bul. 1755, U. S. Dept. of Agr., Washington, D. C., 1935. Price, 5c.)

Veterinary Institutions in Finland. Publications of the Vet. Dept. of the Ministry of Agr., Helsingfors, 1935. pp. 74.

Coryza and Other Respiratory Infections in Chickens. J. R. Beach. Reprint from *Twelfth Intern. Vet. Cong.*, iii (1935), pp. 144-160.


## Regular Army

So much of S.O. 244 as directs Major Samuel G. Kielsmeier to proceed to Fort Ethan Allen, Vt., for duty is amended so as to direct him to proceed to Fort Oglethorpe, Ga., for duty instead.

Each of the following-named officers of the Veterinary Corps is relieved from further assignment and duty at the station specified after his name, effective in time to proceed to Carlisle Barracks, Pa., and report to the commandant Medical Field Service School on or about December 30, 1935, for duty.

1st Lt. John H. Rust, III, Fort Ethan Allen, Vt.
1st Lt. Andrew J. Sirilo, Fort Sill, Okla.
1st Lt. Bernard F. Trum, West Point, N. Y.

Major Burlin C. Bridges is relieved from further assignment and duty at Fort Oglethorpe, Ga., effective in time to proceed to Fort Ethan Allen, Vt., and report on or about December 20, 1935, to the commanding officer for duty.

Major Charles B. Dunphy, upon his own application, after more than nineteen years of service, is retired from active service, to take effect January 31, 1936, under the provisions of section 5 of the act of Congress approved July 31, 1935. He is relieved from his present assignment and duty at Fort Sheridan, Ill., on January 31, 1936, and, at the proper time, will proceed to his home.

Each of the following-named officers of the Veterinary Corps is relieved from further assignment and duty as student, Army Veterinary School, Army Medical Center, Washington, D. C., effective upon completion of his present course of instruction, on or about February 9, 1936; will then proceed to the station as specified after his name and report for duty accordingly.

Lt. Colonel Daniel B. Leininger, Fort Sill, Okla.
Lt. Colonel Isaac O. Gladish, Fort Sam Houston, Texas.

Major Will C. Griffin is relieved from further assignment and duty as a student, Army Veterinary School, Army Medical Center, Washington, D. C., effective upon completion of his present course of instruction, on or about February 9, 1936; will then proceed to Chicago, Ill., and report to the commanding officer Chicago quartermaster depot for duty, and to the commanding general, Sixth Corps Area, for additional duty at his headquarters.

Major Fred W. Shinn is relieved from further assignment and duty as a student, Army Veterinary School, Army Medical Center, Washington, D. C., effective upon completion of his present course of instruction on or about February 9, 1936; is then assigned to duty at Fort Francis E. Warren, Wyo., and will proceed to New York, N. Y., and sail on the transport scheduled to leave that port on or about February 11, 1936, for San Francisco, Calif.; upon arrival in San Francisco will proceed to Fort Francis E. Warren, Wyo., and report to the commanding general for duty.

## Veterinary Reserve Corps

### Change in Name

To:

Mangus, Joseph David.....Manes, Joseph David, Courtland, Kan.

### New Acceptances

Barta, James Chester.....1st Lt...1518 E. 18th St., Spokane, Wash.
Burke, Edward Joseph.....1st Lt...43 Broad St., Torrington, Conn.
Cady, Duane LeRoy.....1st Lt...Arlington, Neb.
Close, Philip Cashman.....1st Lt...Earlville, N. Y.
Deal, Alfred Freer.....1st Lt...400 Madison Ave., New York, N. Y.
DeLay, Paul Daniel.....1st Lt...730 E St., Eureka, Calif.
Dirstine, Jean Hitchcock....1st Lt...1916 Eye St., Eureka, Calif.
Eliason, Theodore Robert....1st Lt...Kerkhoven, Minn.
Hendee, Cecil LeRoy.....1st Lt...Pinckney, Mich.
Matthews, Alvin Roland.....1st Lt...Ponce de Leon, Fla.
Nash, James Sexton.....1st Lt...Howell, Mich.
North, Arthur Fillmore, Jr..1st Lt...Care Millar Small-Animal Hospital, Monmouth Rd., Deal, N.J.
Osteen, Wilson Marshall.....1st Lt...Pembroke, Ga.
Platt, Wm. Barry.....1st Lt...RFD 2, Somerville, N. J.
Rea, Robert Charles.....1st Lt...West Branch, Mich.
Thorp, Wm. Taylor Steele...1st Lt...RFD 4, Allegan, Mich.
Tropp, Morris Louis.....1st Lt...811½ Luttrell St., Knoxville, Tenn.
Tubis, Philip Shelwyn.....1st Lt...1029 S. 10th St., Philadelphia, Pa.
Wendell, Carl Edward.....1st Lt...General Delivery, Vermont, Ill.
Wilson, Louis .....1st Lt...4322 S. Salina St., Syracuse, N.Y.

### Promotions

To:

Adan, Cirilo Lagmay.....1st Lt...121 W. 12th St., Junction City, Kan.
Asbill, Stephen Grieve.....1st Lt...Davis, Calif.
Badger, George William.....1st Lt...Wilson, N. Y.
Barrett, John Henry.....1st Lt...1 Newton Ave., Westerly, R. I.
Bentham, Wilfred Sylvester..1st Lt...Route 1, Box 708, Vallejo, Calif.
Buell, Herbert James.....1st Lt...Constable, N. Y.
Burriss, Kenneth Kent.....1st Lt...93 Adams St., Fairhaven, Mass.
Carlin, Max Harold.....1st Lt...569 E. 106th St., Cleveland, Ohio.
Couch, Weldon Morris.....1st Lt...Grandview, Tex.
Crawford, Andy William....1st Lt...Rolling Fork, Miss.
Daman, Arthur Henry.....1st Lt...217 Roup Ave., E. E., Pittsburgh, Pa.
Donat, Lawrence Charles....1st Lt...Verdigre, Neb.
Ehrlich, David .....1st Lt...89 Pulaski St., Brooklyn, N. Y.
Emas, Jack Robert.....1st Lt...638 E. Water St., Lock Haven, Pa.
Geisler, Richard Edward....1st Lt...P. O. Box 792, Carmel, Calif.
Goodman, Simon Joseph....1st Lt...2114 E. Auburn St., Philadelphia, Pa.
Greene, James Ethridge.....1st Lt...Cody Rd., Columbus, Ga.
Harlan, William Henry.....1st Lt...826 N. W. 31st St., Oklahoma City, Okla.

Hensley, John Herbert.....1st Lt...1124 Bannock Ave., Boise, Idaho.
Hibbs, Leonard Wilbur.....1st Lt...927 Cleveland Ave., Kansas City, Kan.
Higby, Willard Charles.....1st Lt...Turin, N. Y.
Huber, Samuel Flickinger, Jr.1st Lt...297 E. Commerce St., Bridgeton, N. J.
Kermen, William Robert....1st Lt...1617 S. Flower St., Los Angeles, Calif.
Kerr, George Miller.....1st Lt...8 Garfield Ave., Hyattsville, Md.
Krukowski, Stanley Martin..1st Lt...Southold, Long Island, N. Y.
Leach, Benjamin Francis....1st Lt...East Fairfield, Vt.
Lieberman, Leo Leibsch.....1st Lt...276 Mill Hill Ave., Bridgeport, Conn.
McDonald, Alvin Rutti.....1st Lt...RFD 1, Bremen, Kan.
McMichael, William Wallace.1st Lt...Paonia, Colo.
Mace, Don Lee.....1st Lt...Care Vaca Meat Co., Vacaville, Calif.
Mendenhall, William Ira....1st Lt...1619 Belmont Ave., Seattle, Wash.
Michael, Lloyd Jake.....1st Lt...Rural Route 2, Eudora, Kan.
Odom, Houston .....1st Lt...Auburn, Ala.
Perella, Dorwin Herman....1st Lt...97 West St., Johnson City, N. Y.
Pnillips, Harry Lewis.....1st Lt...Red Schoolhouse Road, Spring Valley, N. Y.
Reese, William Clifford.....1st Lt...RFD 1, Earlville, N. Y.
Rippetoe, Culver Willis.....1st Lt...RFD 2, Meriden, Kan.
Rogers, Arthur Bartlett....1st Lt...528 Miller Ave., S., San Francisco, Calif.
Sample, Fred Marion.....1st Lt...Laird, Colo.
Saunders, Charles Meredith..1st Lt...3319 Tulalip Ave., Everett, Wash.
Scheetz, George Francis.....1st Lt...7 Stephenson Apts., Charlestown, W. Va.
Seagers, William J.....1st Lt...713 E. State St., Ithaca, N. Y.
Shaner, Ralph Franklin.....1st Lt...86 Linden Ave., Middletown, N. Y.
Shipley, Wayne Devere.....1st Lt...326 P. O. Bldg., Baton Rouge, La.
Sibert, Herbert Franklin....1st Lt...Nelson, Neb.
Siemer, Everett John.....1st Lt...4524 Milwaukee St., Denver, Colo.
Smit, Walter .....1st Lt...Alton, Iowa.
Spring, Jacob Emmil.....1st Lt...619 E. Kansas St., St. Joseph, Mo.
Tierney, William Francis...1st Lt...14 Nickerson St., Cazenovia, N.Y.
Todd, Frank Arnold.....1st Lt...98 Park St., New Haven, Conn.
Tuttle, Martin Lyon.....1st Lt...2788 Indianola Ave., Columbus, Ohio.
Wann, Russell S.....1st Lt...416 Elliot St., Alexandria, La.
Watkins, Ernest St. John....1st Lt...1237 Chestnut St., San Francisco, Calif.
Willis, Robert Leon.....1st Lt...Cottageville, S. C.
Wiseman, Edwin Stranel....1st Lt...Delphos, Kan.

VETERINARY RESERVE OFFICERS ON ACTIVE DUTY WITH THE C. C. C. AS OF NOVEMBER 30, 1935

| *Name* | *Rank* | *C. C. C. District or Station* |
|---|---|---|
| | *First Corps Area* | |
| Carlin, Max H. | 1st Lt. | Hq. 1st Corps Area, Boston, Mass. |
| Leach, Benjamin F. | 1st Lt. | Fort Williams, Me. |
| Lieberman, Leo L. | 1st Lt. | Fort Ethan Allen, Vt. |
| McDonald, Alvin R. | 1st Lt. | Fort Adams, R. I. |
| Phillips, Harry L. | 1st Lt. | Fort H. G. Wright, N. Y. |
| Todd, F. Arnold. | 1st Lt. | Montpelier, Vt. |

| *Name* | *Rank* | *C. C. C. District or Station* |
|---|---|---|
| | *Second Corps Area* | |
| Buell, Herbert J. | 1st Lt. | Fort Totten, N. Y. |
| Ehrlich, David | 1st Lt. | Camp Dix, N. J. |
| Higby, Willard C. | 1st Lt. | Fort Wadsworth, N. Y. |
| Huber, Samuel F. | 1st Lt. | Schenectady, N. Y. |
| Krukowski, Stanley M. | 1st Lt. | Fort Ontario, N. Y. |
| Reese, William C. | 1st Lt. | Binghamton, N. Y. |
| Seagers, William J. | 1st Lt. | Fort Niagara, N. Y. |
| Shaner, Ralph H. | 1st Lt. | Middletown, N. Y. |
| Tierney, William F. | 1st Lt. | Fort DuPont, Del. |
| | *Third Corps Area* | |
| Bartlett, Densil C. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Daman, Arthur H. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Emas, Jack R. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Goodman, Simon J. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Kerr, George M. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Perella, Dorwin H. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Werrin, Nathaniel | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| Wiseman, Edwin S. | 1st Lt. | Hq. 3rd Corps Area, Baltimore, Md. |
| | *Fourth Corps Area* | |
| Chastain, W. R. | 1st Lt. | Fort Screven, Ga. |
| Greene, James E. | 1st Lt. | Fort McPherson, Ga. |
| Odom, Houston | 1st Lt. | Fort Barrancas, Fla. |
| Shipley, Wayne Devere | 1st Lt. | Fort Benning, Ga. |
| Spring, Jacob Emmil | 1st Lt. | Fort Moultrie, S. C. |
| Thiele, Arthur R. | 1st Lt. | Fort Bragg, N. C. |
| Wann, Russell S. | 1st Lt. | Camp Beauregard, La. |
| Whitfield, John S. | 1st Lt. | Fort Oglethorpe, Ga. |
| Willis, Robert Leon | 1st Lt. | Fort McClellan, Ala. |
| | *Fifth Corps Area* | |
| Broad, Fay E. | Capt. | Fort Benjamin Harrison, Ind. |
| Earhart, Robert N. | 1st Lt. | Fort Thomas, Ky. |
| Hinkle, Truman B. | Major | Fort Knox, Ky. |
| Hock, Leo A. | Capt. | Fort Hayes, Ohio. |
| Scheetz, George F. | 1st Lt. | Dist. Hqrs., Charleston Dist., Charleston, W. Va. |
| Tuttle, Marion F. | 1st Lt. | Fort Benjamin Harrison, Ind. |
| Yost, Hursh R. | Capt. | Dist. Hqrs., Charleston Dist., Charleston, W. Va. |
| | *Sixth Corps Area* | |
| Hudson, Bentley F. | Capt. | Camp Custer, Mich. |
| Jones, Lloyd D. | 1st Lt. | Fort Brady, Mich. |
| Law, Buell S. | Capt. | Sparta C.C.C. Dist. Hqrs., Sparta, Wis. |

| *Name* | *Rank* | *C. C. C. District or Station* |
|---|---|---|
| Nichols, Jeptha H. | 1st Lt. | Fort Sheridan, Ill. |
| Shoaff, Walter P. | Capt. | Jefferson Barracks, Mo. |

*Seventh Corps Area*

| | | |
|---|---|---|
| Adan, Cirilo Lagmay | 1st Lt. | Fort Meade, S. Dak. |
| Anderson, Horace Leslie | Capt. | Fort Des Moines, Iowa. |
| Donat, Lawrence Charles | 1st Lt. | Fort Crook, Neb. |
| Hibbs, Leonard Wilbur | 1st Lt. | Fort Snelling, Minn. |
| Kelley, Donald Clifford | 1st Lt. | Fort Crook, Neb. |
| Magens, Hans Juergen | Capt. | Fort Leavenworth, Kan. |
| Meeks, Robert Benjamin | Major | Fort Leavenworth, Kan. |
| Michael, Lloyd Jake | 1st Lt. | Fort Riley, Kan. |
| Morrison, Harold Loran | 1st Lt. | Fort Leavenworth, Kan. |
| Mydland, Halder Thomas | 1st Lt. | Fort Riley, Kan. |
| Rippetoe, Culver Willis | 1st Lt. | Dist. Hqrs., Little Rock, Ark. |
| Sibert, Herbert Franklin | 1st Lt. | Fort Crook, Neb. |
| Smit, Charles Rudolph | 1st Lt. | Fort Snelling, Minn. |
| Smit, Walter | 1st Lt. | Fort Snelling, Minn. |
| Steele, Merrill Lester | Capt. | Fort Lincoln, N. Dak. |

*Eighth Corps Area*

| | | |
|---|---|---|
| Burkey, Fred M. | 1st Lt. | Lufkin Dist., Lufkin, Tex. |
| Christensen, Nels F. | 1st Lt. | Lubbock Dist., Lubbock, Tex. |
| Couch, Weldon M. | 1st Lt. | Tucson Dist., Tucson, Ariz. |
| Evans, Tom | 1st Lt. | Aubuquerque Dist., Albuquerque, N. M. |
| Gale, Howard | Capt. | Phoenix Dist., Phoenix, Ariz. |
| Hamman, Fred I. | Capt. | Casper Dist., Casper, Wyo. |
| Harlan, William H. | 1st Lt. | Oklahoma City Dist., Oklahoma City, Okla. |
| McGrath, James C. | Capt. | Littleton Dist., Littleton, Colo. |
| McMichael, William W. | 1st Lt. | Fort Bliss Dist., Fort Bliss, Tex. |
| Reid, Joseph J. | Capt. | San Antonio Dist., San Antonio, Tex. |
| Sample, Fred M. | 1st Lt. | Tyler Dist., Tyler, Tex. |
| Shipley, Michael | Capt. | Fort Worth Dist., Fort Worth, Tex. |
| Siemer, Everett J. | 1st Lt. | Silver City Dist., Silver City, N. M. |
| Thompson, William H. | 1st Lt. | Grand Junction Dist., Grand Junction, Colo. |
| Wirtz, John H. | Capt. | Muskogee Dist., Muskogee, Okla. |

*Ninth Corps Area*

| | | |
|---|---|---|
| Adams, John D. | Capt. | Boise, Idaho. |
| Andrews, Asa R. | Capt. | Pres. of San Francisco, Calif. |
| Asbill, Stephen G. | 1st Lt. | Redding, Calif. |
| Bentham, Wilfred S. | 1st Lt. | Fort Missoula, Mont. |
| Bolenbaker, R. F. | Capt. | Fresno, Calif. |
| Bolender, Fred J. | 1st Lt. | Fort Missoula, Mont. |
| Castleberry, Guy | Capt. | Fort Douglas, Utah. |
| Geisler, Richard E. | 1st Lt. | Pres. of Monterey, Calif. |
| Hartzell, Harold P. | 1st Lt. | Fort Douglas, Utah. |
| Hensley, John H. | 1st Lt. | Boise, Idaho. |
| Hoon, Henry R. | Capt. | Lewiston, Idaho. |

| *Name* | *Rank* | *C. C. C. District or Station* |
|---|---|---|
| Kermen, William R. | 1st Lt. | Fort MacArthur, Calif. |
| Mace, Don L. | 1st Lt. | Eureka, Calif. |
| Mangus, Joseph D. | 1st Lt. | Fort Lewis, Wash. |
| Martin, Earl T. | Capt. | Pres. of San Francisco, Calif. |
| Mendenhall, William I. | 1st Lt. | Seattle, Wash. |
| Orr, Norton A. | 1st Lt. | Fort Douglas, Utah. |
| Paxton, John D. | Capt. | Sacramento, Calif. |
| Rogers, Arthur B. | 1st Lt. | Pocatello, Idaho. |
| Saunders, Charles M. | 1st Lt. | Seattle Q. M. Depot, Wash. |
| Townsend, Jay G. | Major | Vancouver Bks., Wash. |
| Watkins, Ernest St. J. | 1st Lt. | Medford, Ore. |
| White, Alfred E. | 1st Lt. | March Field, Calif. |
| Wilson, Willis | Capt. | Fort George Wright, Wash. |

## Four More States Reach Goal

The number of states now free of tuberculosis was increased to 37, the first of January, with the accreditation of Delaware, Mississippi, Oklahoma and Arizona. The degree of infection in most of these states was not high, but repeated retesting was necessary to meet the requirements of a modified accredited area. Less than one-fourth of the states now remain to be accredited.

## Massachusetts Membership in the A. V. M. A.

| *Year* | *Members* | *Year* | *Members* |
|---|---|---|---|
| 1923 | 71 | 1929 | 85 |
| 1924 | 68 | 1930 | 86 |
| 1925 | 67 | 1931 | 88 |
| 1926 | 67 | 1932 | 87 |
| 1927 | 72 | 1933 | 87 |
| 1928 | 81 | 1934 | 85 |
| 1935 | 83 | | |

## New President of R. C. V. S. a Practitioner

Mr. J. W. McIntosh, M. R. C. V. S., F. R. S. E., of Cricklewood, London, England, recently was installed as president of the Royal College of Veterinary Surgeons for 1935-1936, succeeding Mr. G. H. Locke. This is the second successive year that the presidency has been filled by a practitioner. Mr. McIntosh has been a member of the College since 1893.

Let ignorance talk as it will, learning has its value.—DE LA FONTAINE.

# COMMUNICATION

## LOUISIANA WAIVES MEMBERSHIP FEE

TO THE EDITOR:

It may interest you to know that we (Louisiana Veterinary Medical Association) already exempt all B. A. I. employés from paying the membership fee, requiring that they pay the annual dues only. This has been in effect for several years with us, and we find it a very satisfactory arrangement. As the Bureau men are shifted about over the U. S., we took the position early that it was unfair to ask them to pay a membership fee in every state in which they are temporarily located. Your article in the January issue of the JOURNAL, "Suggestions to the State Associations," is very timely and should be adopted by every state association.

J. ARTHUR GOODWIN.

*New Iberia, La., January 22, 1936.*

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## COMING VETERINARY MEETINGS

(Continued from page 118)

Louisiana Veterinary Medical Association and Louisiana State University Veterinary Short Course. Dalrymple Memorial Building, Louisiana State University, Baton Rouge, La. February 26-27, 1936. Dr. C. M. Heflin, Secretary, Box 1933, Baton Rouge, La.

East Tennessee Veterinary Medical Society. White Surgical Supply Building, Knoxville, Tenn. March 7, 1936. Dr. Robert L. Hummer, Secretary, 312 W. Church Ave., Knoxville, Tenn.

Maine Veterinary Medical Association. Orono, Me. March 26, 1936. Dr. S. W. Stiles, Secretary, Falmouth Foreside, Me.

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First Farmer: "I've got a freak on my farm—a two-legged calf."

Second Farmer: "Yes, I know. He came to call on my daughter last night."


## VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The December meeting of the Veterinary Medical Association of New York City was held at the Hotel New Yorker, December 4, 1935. The speaker of the evening was Mr. James O. Hoyle, Investigator for the Profession, State Department of Education, Albany, N. Y. His topic was "Veterinary Medicine and the Law." Mr. Hoyle informed the members that the State Department of Education had obtained four convictions and was coöperating with the profession in every possible manner to stamp out quacks and imposters, but with an antiquated Veterinary Practice Act it is practically impossible to combat the present-day evils. Laymen are not the only violators, for some veterinarians are guilty of covering up the acts of unreliable individuals, according to Mr. Hoyle. To stamp out this practice the Veterinary Medical Association of New York City will join with Dr. H. H. Horner, Deputy Commissioner of Higher Education, State Department of Education, Albany, N. Y., and his associates in drawing up a new and pliable practice act.

The election resulted in the following officers being reëlected for the ensuing year: President, Dr. C. V. Noback, New York; vice-president, Dr. John E. Crawford, Far Rockaway; secretary-treasurer, Dr. R. S. MacKellar, Jr., New York.

The election of the Board of Censors resulted as follows: Dr. C. P. Zepp, Chairman, New York; Dr. J. B. Engle, Summit, N. J.; Dr. S. Shapera, Mamaroneck; Dr. John E. Crawford, Far Rockaway, and Dr. J. Lebish, New York.

R. S. MacKellar, Jr., *Secretary-Treasurer.*

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## OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The twenty-first annual meeting of the Oklahoma Veterinary Medical Association took place in the Hotel Skirvin, Oklahoma City, January 6-7, 1936. The attendance was somewhat below

that of the 1935 annual meeting but was, nevertheless, above the average.

Following the opening of the meeting by President E. W. Meads, an invocation by Rev. T. A. Williams, of Oklahoma City, and a splendid address of welcome by Mayor Frank Martin, the remainder of the first morning session was devoted to transaction of such necessary Association business as election of officers, reading of minutes, reports of committees, and admission of new members.

Heading the literary program for the first afternoon was an interesting paper by Dr. J. C. Flynn, president of the American Veterinary Medical Association, which he chose to call "Puppy Problems," but in reality it was more than that, for it covered the entire field of canine genetics and eugenics, and a wide range of breeding problems encountered by the small-animal practitioner.

Dr. W. C. McConnell, of Holdenville, offered a masterfully prepared article on "Some Phases of Calcium Metabolism and Therapy." The lively and prolonged discussion which followed the presentation of this topic is ample evidence that the study of mineral metabolism in relation to animal nutrition and health is being recognized as one of the major branches of veterinary science and worthy of more serious attention than it has received in the past.

A rare treat was in store for the members and guests in attendance when Dr. E. A. Benbrook, of Iowa State College, Ames, Iowa, gave his illustrated lecture on "Parasites Common to Man and the Lower Animals, and the Veterinarian's Duties and Responsibilities in Preventing Transmission from Animal to Man." Having the happy faculty and uncommon talent of being able to translate dry scientific facts and data into the pleasing language of fiction, his presentation of this very much neglected subject was most impressive and easily rates as one of the highlights of the meeting.

"Observations on Horse Breeding, and Veterinary Activities in England and France" was the title of an interesting paper by Major E. C. Conant, of the United States Army Remount Service, Fort Reno, in which he related his personal experiences and observations during his recent visit to England and the continent of Europe. Comparing the English, French and American methods of breeding, and the relative status of the veterinary profession in the three countries, he left no doubt that each one had certain points of superiority which might profitably be adopted by the others.

The banquet, served at 7 o'clock Monday evening, was, as usual, the principal social event of the meeting. Attendance was all that could be expected, the food was excellent, and the entertainment, consisting of vocal and instrumental music and humorous specialty features, served to put the guests in fine humor. Dr. W. H. Miles, Director of Public Health for Oklahoma City, acted as toastmaster. Dr. R. U. Patterson, Dean of the Medical Department, University of Oklahoma, and former Surgeon General of the United States Army, was the principal guest and speaker of the evening. In his remarks on his former relations with the Army Veterinary Corps, he paid glowing tribute to the veterinary profession and commended it on the rapid advancement it has made, and the many scientific achievements to its credit in the interest of human welfare.

Continuing the program on the second day, Dr. R. D. Turk spoke on his observations gathered as technician in charge of the State-Federal Laboratory in Oklahoma City. Many points of interest regarding the Bang's disease campaign now in progress were brought out during this discussion.

Dr. E. A. Benbrook appeared on the program for the second time, giving a very instructive discussion on the selection and preparation of specimens to be sent to a laboratory for diagnosis.

Dr. Chas. Murray, of the Veterinary Research Institute, Iowa State College, gave an interesting review of the swine disease situation, with special reference to hog cholera. His observations, based on research and experiments, indicated that the various curative agents now recommended and used in the treatment of the paratyphoid type of infection in swine were of questionable value and that isolation and practice of sanitary measures still hold out the only hope of relief in these conditions. His discussion of the recent experiments with tissue vaccine immunization against hog cholera and the results of baby pig vaccination was a most enlightening contribution to the program. The subject of swine diseases was further continued in a round-table discussion, led by Dr. A. T. Kinsley, of Kansas City, Missouri.

The program was concluded with a presentation of the principles and requirements of effective meat inspection, particularly as it applies to municipal and state meat inspection, by Dr. J. H. Kitzhofer, B. A. I. inspector in charge of meat inspection in Oklahoma City, and a review of the activities of the past year, the present status and the future of public live stock sanitary work by Dr. C. C. Hisel, State Veterinarian of Oklahoma. Both subjects were well presented and interestingly discussed.

The question of selecting a place for the 1936 summer meeting came up for discussion, and was finally disposed of by the ma-

jority of the members voting to invite the Arkansas Veterinary Medical Association to a joint meeting of the two associations to be held in Fayetteville, Arkansas.

Election of officers for the ensuing year resulted as follows: President, Dr. W. L. Hiatt, Edmond; vice-president, Dr. W. L. Christy, Tonkawa; secretary, Dr. C. H. Fauks, Oklahoma City, and treasurer, Dr. F. Y. S. Moore, McAlester, both reëlected; Dr. C. C. Hisel, Oklahoma City, and Dr. C. H. McElroy, Stillwater, delegate and alternate, respectively, to the A. V. M. A. House of Representatives.

C. H. FAUKS, *Secretary.*

## UNIVERSITY OF PENNSYLVANIA CONFERENCE OF VETERINARIANS

The thirty-sixth annual Conference of Veterinarians was held at Philadelphia, at the Veterinary School of the University of Pennsylvania, January 7-8, 1936. It was estimated that upwards of 200 veterinarians were in attendance, although no actual roll-call was attempted. The estimate is based on the fact that both of the halls used for the meetings were filled beyond seating capacity. Without a doubt this conference was one of the best attended in many years, and the consensus expressed reflected commendation on the choice of speakers and subject appeal.

At the afternoon session of the first day, the following speakers were heard: Dr. Irving M. Cashell, Washington, D. C., on "Diseases of the Eye, Ear and Throat Observed During the Past Year." Dr. Mark W. Allam, Media, Pa., discussed "Cases in Small-Animal Practice." Dr. E. F. Schroeder, Boston, Mass., gave an illustrated talk on "Fractures and Dislocations." Dr. W. L. Williams, Ithaca, N. Y., discussed "Dropsy of the Amnion and Allantois."

The program for the evening of the same day presented Dr. H. H. Cole, of the University of California; Dr. R. A. Kern, of Philadelphia, and Col. Robert J. Foster, V. C., U. S. Army, Washington, D. C. Dr. Cole presented a paper entitled, "Hormones Concerned in Reproduction and Their Use in Veterinary Medicine." Dr. Kern discussed "The Present Status of Bang's Disease in Man," and Colonel Foster outlined some of the conditions confronting those engaged in army veterinary service.

Wednesday morning, Dr. Williams again appeared before the group with a report on "The Problem of Teratology as Related to Clinical Veterinary Medicine." He was followed by Dr. E. C. McColloch, of Philadelphia, on "Disinfectants and Their Use."

Dr. H. M. Martin, of the veterinary faculty, presented "The Life History of the Whipworm and Heartworm of Dogs." Dr. R. S. Amadon, also of the veterinary faculty, gave a discussion and demonstration of "Blood and Saline Transfusion in Horse and Cattle Practice."

The afternoon program was comprised of an address by Dr. H. M. Kalodner, Director of the Pennsylvania Bureau of Animal Industry, on "Activities of the Pennsylvania Bureau of Animal Industry and Their Relation to the Practicing Veterinarian." Hon. J. H. French, Secretary of Agriculture, Harrisburg, Pa., discussed "The Live Stock of Pennsylvania," and Dr. Hubert Bunyea, of the U. S. Bureau of Animal Industry, Washington, D. C., told "What Veterinarians Have Done, Are Doing and Should Do for the Poultry Industry." Dr. I. D. Wilson, of the Virginia Polytechnic Institute, Blacksburg, Va., presented a paper on "Coccidiosis of Animals" and Dr. Carl TenBroeck, of the Rockefeller Institute, Princeton, N. J., discussed "Recent Work on Encephalomyelitis in Horses."

A. H. CRAIGE, *Reporter.*

## OHIO STATE VETERINARY MEDICAL ASSOCIATION

The fifty-third annual meeting of the Ohio State Veterinary Medical Association was held at Columbus, January 9-10, 1936. It was the best attended meeting in years, over 300 veterinarians being present.

The literary program consisted of the following papers:

"Differentiation, Diagnosis and Manner of Handling Swine Diseases," by Dr. Frank Breed, Lincoln, Nebraska.

"Distemper Immunization of Dogs," by Dr. J. C. Flynn, Kansas City, Missouri.

"Some Diseases of the Skin of the Dog and Their Treatment" and "Anesthesia in Dogs and Cats," by Dr. E. C. Khuen, Evanston, Illinois.

"Legislation Relating to Community Sales, and Some Observations and Recommendations on the Illegal Practice of Veterinary Medicine," by Dr. F. A. Zimmer, Columbus.

"Horse Practice and Equine Influenza," by Dr. T. A. Sigler, Greencastle, Indiana.

"Mastitis in Cattle," by Dr. W. R. Krill, Columbus.

"Major Problems in Sheep Practice," by Dr. E. D. Martin, Reynoldsburg.

"The Veterinarian and Public Health," by Dr. W. P. S. Hall, Toledo.

A banquet and dance brought the program of the first day to a close. Dr. J. W. Jackman presided as toastmaster and introduced the guest speakers, Hon. H. S. Atkinson, trustee of Ohio

State University; Hon. Earl Hanefeld, Ohio Director of Agriculture; Dr. J. C. Flynn, president of the A. V. M. A., and Dr. T. A. Sigler, former president of the A. V. M. A. Approximately 200 attended the banquet, which was one of the best ever held in connection with the Association, both in regard to food and entertainment.

A special program of entertainment for the ladies was given during their visit in Columbus, and about 100 ladies were present at these events. The Committee on Local Arrangements needs to be especially commended for their efforts in this connection.

Officers for 1936 were elected as follows: President, Dr. J. W. Jackman, Columbus; vice-president, Dr. H. E. Myers, Cleveland; secretary, Dr. R. E. Rebrassier, Columbus; treasurer, Dr. D. C. Hyde, Columbus, and member of executive committee, Dr. E. W. Roberts, Reynoldsburg.

R. E. REBRASSIER, *Secretary.*

## MAINE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Maine Veterinary Medical Association was held at the Elmwood Hotel, Waterville, on January 8, 1936, at 7:30 P. M.

The speakers of the evening were Drs. Webster Chester, Colby College; J. F. Witter, University of Maine, and Robert Knudson, Augusta.

The following officers were elected for the ensuing year: President, Dr. R. E. Libby, Richmond; vice-president, Dr. J. F. Witter, Orono; secretary-treasurer, Dr. S. W. Stiles, Falmouth Foreside. Members of the Executive Committee are: Drs. C. F. Davis, Rumford Falls; E. E. Russell, Farmington, and C. L. Ryan, Dexter.

R. E. LIBBY, *Secretary.*

## VERMONT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Vermont Veterinary Medical Association was held at the Tavern, in Montpelier, the afternoon and evening of January 11, 1936. President N. H. Tenney presided. After several items of business were disposed of, three new members were admitted: Drs. Lester A. Treat (O. S. U. '32), of Bennington; E. M. Powers (Ont. '35), of Bradford, and E. W. Wilson (K. S. C. '31), of Glover.

Dr. L. H. Adams, of Montpelier, delegate to the A. V. M. A. House of Representatives, gave a very good report of the meet-

ing at Oklahoma City. Dr. A. F. Ranney, of the State Bang's Disease Laboratory, gave a report on the retest of low-titre reactors.

Dr. D. W. Baker, of the New York State Veterinary College, Cornell University, spoke on "Animal Parasites," describing chiefly those affecting the horse.

The ladies had a very pleasant treat in the form of a trip through the Vermont Historical Society Museum. They were escorted by the custodian, Miss Lawson. At 6:15 the ladies joined the gentlemen at a very enjoyable dinner served in a private dining-room at the Tavern. The young daughters, aged 5 and 8, of Deputy Commissioner and Mrs. R. S. Going rendered several selections on the piano, solos and duets, in a very pleasing manner, showing wonderful talent for girls so young. Dr. Adams called on several of those present for impromptu talks.

The election of officers resulted as follows: President, Dr. H. L. Mills, Burlington; first vice-president, Dr. H. C. Stetson, Saint Johnsbury; second vice-president, Dr. D. A. Hopkins, Brattleboro, and secretary-treasurer, Dr. G. N. Welch (reëlected), Northfield.

G. N. WELCH, *Secretary.*

## Saint Louis District Veterinary Medical Association

The January meeting of the Saint Louis District Veterinary Medical Association was held at Hotel Melbourne, Saint Louis, Mo., January 8, 1936. Officers elected for the year are: President, Dr. L. C. Stewart, East Saint Louis, Ill.; vice-president, Dr. G. H. Bruns, National Stock Yards, Ill.; secretary-treasurer, Dr. Milton R. Fisher, Saint Louis, Mo.

MILTON R. FISHER, *Secretary.*

## Illinois State Veterinary Medical Association

For the first time in quite a while, an annual meeting of the Illinois State Veterinary Medical Association will be held in Chicago, February 5-6-7, 1936. Meetings of recent years have been held in Springfield for several reasons. One of these was that an opportunity was presented for veterinarians to contact members of the State Legislature, while this body was in session. The meeting will be held at the Palmer House. The first two days will be devoted to business and papers and the annual banquet will be held on Thursday evening. On Friday, an all-day clinic will be held.

# NECROLOGY

## WILLIAM MORRIS EVANS

Dr. William Morris Evans, formerly of Boston, Mass., passed away in Florida, June 12, 1934, according to a note recently received from a sister-in-law.

Born in Liverpool, England, July 26, 1872, Dr. Evans attended the New Veterinary College in Edinburgh. He left his native land and completed his veterinary education at the Ontario Veterinary College as a member of the class of 1903. For many years Dr. Evans was with the Angell Memorial Hospital in Boston. He resigned this position several years ago and practiced in Boston for a few months before going to Florida.

Dr. Evans joined the A. V. M. A. in 1928. He had been a member of the Massachusetts Veterinary Association since 1925.

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## CLAUDE D. EVANS

Dr. Claude D. Evans, of Kane, Pa., died June 8, 1935, according to word just received from his widow. The cause of death was undulant fever contracted three years previously.

Born at Kane, Pa., April 30, 1894, Dr. Evans attended local grade and high school before entering the McKillip Veterinary College. Following his graduation in 1916, he returned to Kane, where he engaged in general practice.

Dr. Evans joined the A. V. M. A. in 1926. He was a member of the Northwest Pennsylvania Veterinary Club. He is survived by his widow (née Olive Wood).

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## WALTER HOWARD BUSHER

Dr. Walter H. Busher, of Novato, Calif., died June 15, 1935, according to word received only recently. He was born at Akron, Ohio, November 22, 1890, and was a graduate of the San Francisco Veterinary College, class of 1918. Dr. Busher joined the A. V. M. A. in 1919. He was a member of the Twelfth International Veterinary Congress.

## GEORGE MATLACK GARRETT

Dr. George M. Garrett, of West Chester, Pa., died April 20, 1935, in the Chester County Hospital, after an illness of several weeks.

Born at West Chester, Pa., December 9, 1876, Dr. Garrett attended the Williamson School and West Chester Normal College before entering the University of Pennsylvania for the study of veterinary medicine. He was graduated in 1907 and in the fall of that year entered the service of the U. S. Bureau of Animal Industry. During his service he was stationed in various cities and was a member of the Philadelphia force when he died. During the Spanish-American War, Dr. Garrett served for six months as a private with the 6th Regiment Pennsylvania Volunteer Infantry.

Dr. Garrett's widow (née Eliza B. Martin) followed him in death about four months later. She was the last of his immediate family.

B. P.

## ERROLL SUTTER

Dr. Erroll Sutter, of Golva, N. Dak., is reported to have died July 1, 1935, of a heart attack, at Harlan, Iowa, while on vacation en route to his old home near Pittsburgh, Pa. He was a graduate of the Chicago Veterinary College, class of 1904, and practiced at Beach, N. Dak., before going to Golva. He was a former member (1911-1917) of the A. V. M. A.

## WILLIAM E. SYMNS

Dr. William E. Symns, of Hutchinson, Kan., died October 9, 1935, as the result of the explosion of a gas jet in his automobile. He was unable to get out of the car and was burned to death. Dr. Symns was a graduate of the Ontario Veterinary College, class of 1904, and had been located at Hutchinson ever since his graduation. He had served his city as mayor.

## DANIEL WALLACE HARRINGTON

Dr. D. W. Harrington, of Sunnyside, Wash., died suddenly at his home on January 1, 1936. He was 58 years of age.

Following his graduation from Washington State College in 1905, Dr. Harrington located at Sunnyside and practiced there

continuously until his death. He took an active interest in all community, religious and political affairs.

E. E. W.

## J. FLUE BARNETT

Dr. J. F. Barnett, of Yazoo City, Miss., died November 4, 1935, of pneumonia.

Born near Carthage, Miss., December 8, 1873, Dr. Barnett attended local grade and high school before entering the Kansas City Veterinary College. Following his graduation in 1903, he located in Yazoo City and practiced there until the time of his fatal illness.

Dr. Barnett joined the A. V. M. A. in 1919. He is survived by four brothers and three sisters.

## ERNEST J. WALSH

Dr. Ernest J. Walsh, of Minot, N. Dak., died December 30, 1935, of cerebral hemorrhage, following an illness of several years.

Born in Accrington, England, June 9, 1870, Dr. Walsh came to Chambly, Quebec, when a small boy. He attended the Ontario Veterinary College and was graduated in 1891. He started practice at Woodbridge, Ont., and from there moved to Imlay City, Mich. He took a postgraduate course at the Chicago Veterinary College in 1904, and six years later located in Minot, where he remained until his death. In recent years Dr. Walsh was interested especially in canine medicine and the rearing of high-class dogs.

Dr. Walsh joined the A. V. M. A. in 1909. He was a member of the North Dakota State Live Stock Sanitary Board, from the time of its organization in 1907 until 1919, and served as its president for ten years. He is survived by his widow (née Annie McIntosh) and one son.

L. M. R.

## WALTER A. LOGAN

Dr. W. A. Logan, of Morristown, Tenn., died instantly of a fractured skull, January 1, 1936, when he slipped and fell while entering his car which he had parked at the curb. The pavement was very slippery after ten days of snow and sleet.

Dr. Logan was a graduate of the Grand Rapids Veterinary College, class of 1915, and practiced at Oxford, Mich., before going to Tennessee. He practiced at Greenville, that state, before locating in Morristown. He was a member of the Tennessee and East Tennessee Veterinary Medical associations. He is survived by his widow and a brother.

M. J.

## OTTO R. SCHUELER

Dr. Otto R. Schueler, of Brooklyn, N. Y., died January 1, 1936. He was born in Brooklyn, September 18, 1884, and was a graduate of the New York-American Veterinary College, class of 1914. At the time of his death, Dr. Schueler was engaged in general practice. He formerly was chief veterinarian, Department of Sanitation, New York City.

Dr. Schueler joined the A. V. M. A. in 1918. He was a member of the Twelfth International Veterinary Congress.

## RALPH K. MILLER

Dr. Ralph K. Miller, of Washington, D. C., was killed in a railroad crossing accident near Beltsville, Md., January 2, 1936. He was a graduate of the United States College of Veterinary Surgeons (Washington, D. C.), class of 1913. He entered the service of the U. S. Bureau of Animal Industry on September 8, 1913, and served continuously until the date of his death. He was a member of the Washington meat inspection force.

M. W.

## ALISTER RUSSELL GALBRAITH

Dr. A. R. Galbraith, of Centralia, Wash., died in a hospital at Everett, Wash., January 4, 1936, following a long illness.

Born in 1886, Dr. Galbraith received his preliminary education in the public schools of Wisconsin and at an academy in Essex, England. His veterinary education was obtained at Washington State College. Following his graduation in 1913, Dr. Galbraith located at Garfield, Wash., and practiced there until about ten years ago, when he removed to Centralia.

Dr. Galbraith joined the A. V. M. A. in 1916 and served as resident secretary for Washington (1919-21). He had been a member of the State Racing Commission since its creation by

the Legislature several years ago. Dr. Galbraith was serving his third term as a member of the Centralia School Board and he was clerk of the board at the time of his death. He was a past president of the local Kiwanis Club, a past master of the Masonic Lodge at Garfield and a past patron of the Eastern Star Chapter at Centralia. He was also a Knight Templar and a member of the Afifi Temple of the Shrine at Tacoma. He was also a past president of the Washington State College Alumni Association. He is survived by his widow, one son, two daughters and two sisters.

E. E. W.

## CECIL VANDERMEER

Dr. Cecil Vandermeer, of Nampa, Idaho, lost his life in a hotel fire in Chehalis, Wash., on the night of January 3, 1936. He was engaged in liver-fluke eradication work at the time of his death. According to newspaper reports, Dr. Vandermeer could easily have saved his life by remaining in his room in the hotel. He had proceeded less than six feet from his room when overcome by smoke. His room was not reached by the flames and he could have escaped through a window very easily had he remained inside and waited for the firemen to reach him.

Born in Holland, Dr. Vandermeer came to this country 25 years ago. His veterinary education was obtained at Washington State College, from which he was graduated in 1925. For awhile he was located at Lynden, Wash. He was a member of Kappa Chapter of Alpha Psi Fraternity. He is survived by his parents, three sisters and three brothers.

E. E. W.

## WALTER FERGUSON

Dr. Walter Ferguson, of Tillamook, Ore., died at his home January 5, 1936, at the age of 48. He had been Tillamook County Veterinarian for many years.

Dr. Ferguson was a graduate of Washington State College, class of 1910, and at the time of his death was president of the Oregon Veterinary Medical Association. Since 1933 he had been president of the Willamette Veterinary Medical Association. He had been quite active in civic and fraternal affairs, and shortly before his death had been elected worthy patron of Silver Wave Chapter, O. E. S.

E. E. W.

## R. W. CARTER

Dr. R. W. Carter, of Mount Holly, N. J., died on January 5, 1936, in the Burlington County Hospital, as the result of a fractured skull, which he received when he fell on an icy pavement the day before Christmas.

Born in Guelph, Ontario, Canada, Dr. Carter was graduated from the Ontario Veterinary College in 1883. At the age of 26 he accepted a position with Pierre Lorillard, then owner of the famous Rancocas Stock Farm, at Jobstown, near Mount Holly, as chief veterinarian and trainer. Dr. Carter retired from active service twelve years ago when the Rancocas Stock Farm was purchased by Harry F. Sinclair. During his professional career, Dr. Carter trained a number of horses which won many noted races in the United States and England.

Dr. Carter joined the A. V. M. A. in 1908. He had been a member of the Veterinary Medical Association of New Jersey since 1907. He was vice-president of the Farmers Trust Company of Mount Holly at the time of his death, which office he had held for twelve years. He had been a director of the banking institution for the past 35 years. He is survived by his widow.

J. G. H.

## TIMOTHY WILLIAM CORKERY

Dr. T. W. Corkery, of Argenta, Ill., died at his home January 8, 1936, after an illness of a week, caused by pneumonia.

Born in Springfield, Ill., September 14, 1854, Dr. Corkery spent his early life there. He had a common school education before entering the Chicago Veterinary College. Following his graduation in 1900, he returned to Urbana, Ill., which had been his home for about 20 years. About 15 years ago he removed to Argenta.

Dr. Corkery joined the A. V. M. A. in 1922. He is survived by his widow (née Alice Young) and five children. There are 14 grandchildren and three great-grandchildren.

## CHARLES E. MUMMERT

Dr. Charles E. Mummert, of Logansport, Ind., died in Saint Joseph's Hospital, January 9, 1936, after an extended illness. He was 64 years old and had been a hospital patient for about four months. A third stroke of apoplexy in less than a year was the cause of death.

Born near Flora, Ind., Dr. Mummert received his early education in the schools of Young America, Ind. In 1907, he was graduated from the Indiana Veterinary College and immediately entered practice at Young America, where he remained until 1929, when he removed to Logansport.

For seven years Dr. Mummert served as a member of the Indiana State Live Stock Sanitary Board. He was a member of the Indiana Veterinary Medical Association and of the Cass County Horsethief Detective Association. He was president of the latter at the time of his death. Several years ago, he was a candidate for county commissioner on the Democratic ticket. He is survived by his widow (née Mary Hunter), one daughter, one son, one sister and three brothers.

J. L. A.

## KARL BURCHARD HANSON

Dr. Karl B. Hanson, of Grafton, Wis., died in the Milwaukee General Hospital, January 15, 1936, after an illness of one week from pneumonia.

Born in Chicago, March 10, 1893, Dr. Hanson received his elementary and college preparatory education in the Washington, D. C., schools. Upon his father's appointment as librarian of the University of Chicago, in 1911, the family moved to the Windy City, where Dr. Hanson was graduated from the Hyde Park High School. He entered the College of Agriculture at the University of Wisconsin in 1912 and was graduated four years later with the B. S. degree. He then decided to study veterinary medicine and enrolled at the Michigan State College, which granted him the D. V. M. degree in 1919. Shortly thereafter, he accepted an appointment in the Bureau of Biological Survey, U. S. Department of Agriculture, as veterinarian for the U. S. Experimental Fur Farm, then located at Keeseville, N. Y., but now at Saratoga Springs, that state.

During the 15 years that Dr. Hanson was in the service of the federal government, he made a number of outstanding contributions in the field of fur farming, with particular reference to the infectious and parasitic diseases of foxes and the gestation period of martens. Early in 1935, Dr. Hanson joined the staff of Fromm Brothers, at their Lakeside Ranch, at Grafton, as scientist in charge of their experiment farm and biological laboratory. Fromm Brothers are the largest breeders of foxes in the world.

Dr. Hanson joined the A. V. M. A. in 1919 and was a frequent contributor to the programs of annual meetings and to the JOURNAL of the A. V. M. A. He was a member of Iota Chapter of Alpha Psi Fraternity. He is survived by his widow (née Katherine N. McAloon), his parents, two sisters and two brothers.

F. B. H. *and* J. E. S.

## AUGUSTINE J. GIBBONS

Dr. Augustine J. Gibbons, of Chicago, Ill., died in the Woodlawn Hospital, Chicago, January 16, 1936, of injuries received when he was struck by a car driven by a hit-and-run driver New Year's Eve. He was 68 years of age.

At the time of the accident, Dr. Gibbons was an employe of the Cook County Treasurer's office. He was a graduate of the Ontario Veterinary College, class of 1895, and had been in practice at Strawn, Ill. He was an assistant state veterinarian from 1904 to 1919. Later he was in the service of the Probate Court.

## CHARLES SALADIN GELBERT

Dr. Charles S. Gelbert, of Ambler, Pa., died in a Philadelphia hospital, January 16, 1936, a few hours after he was found with both wrists slashed. He had undergone an operation a few days previously for the purpose of relieving an abdominal condition from which he had suffered for about 18 months.

It was in the same hospital that Dr. Gelbert's son, "Charley," star shortstop of the Saint Louis Cardinals, was treated successfully for the injuries he received when he accidentally shot himself with a shotgun while hunting a few years ago. Baseball fans are familiar with his plucky fight to stay in the game.

Born December 24, 1871, Dr. Gelbert entered the University of Pennsylvania in 1893. He played on four football teams for the Red and Blue, and also played on several of Penn's baseball teams during the same period. He was chosen by Walter Camp as an end on the all-American football teams of 1894, 1895 and 1896.

Following his graduation from the Veterinary School in 1899, Dr. Gelbert practiced for over 30 years in Scranton and Ambler, Pa. For four years he was connected with the Pennsylvania Bureau of Animal Industry. In addition to his son, Charles, he is survived by his widow, a son, James, and a married daughter.

## F. S. SCHOENLEBER

Dr. F. S. Schoenleber, of Denver, Colo., died on January 6, 1936, in Tampa, Fla., where he was spending the winter. He retired from active pursuits several years ago, after a rather varied career.

Born in Allen Township, La Salle County, Ill., August 6, 1862, Dr. Schoenleber was reared on his parents' farm and educated in the local schools. He took a course at the Morris (Ill.) Normal School and, following graduation, taught school in Grundy County for two years. He was principal of the Ransom schools and later was professor of German and natural science in the Norton Normal and Scientific Academy at Wilton Junction, Iowa. He then went to Ames and enrolled as a student in the College of Agriculture. He received his B. S. A. in 1885 and his M. S. A. two years later. While he was taking his postgraduate work, he held the position of farm foreman at Iowa State College.

In 1888, Dr. Schoenleber became associate editor of the *Orange Judd Farmer* in Chicago. He continued this connection while taking a course at the Chicago Veterinary College. Following his graduation in 1890, he located at Morris, Ill., where he engaged in general practice and operated a livery stable. In 1896, he was appointed to the chair of anatomy and histology in the McKillip Veterinary College, Chicago. Later he was made dean of the institution. In the winter of 1899, he started the study of human medicine and in 1901 received his M. D. from the Harvey Medical College, Chicago. The same year, he was graduated from the National Medical University, also of Chicago. Later he studied osteopathy and was registered in Illinois.

In 1904, Dr. Schoenleber went to Manhattan, Kansas, to accept the position of professor of veterinary medicine at Kansas State College, made vacant by the resignation of Dr. N. S. Mayo, who had gone to Cuba to accept a position as veterinarian to the Cuban Agricultural Experiment Station. Dr. Schoenleber was also state veterinarian of Kansas. He remained at Manhattan until 1917, when he resigned his college position. The office of state veterinarian had been discontinued in the meantime. Shortly after Dr. Schoenleber went to Kansas, a course in veterinary medicine leading to a degree was started, and the first class of seven graduates finished in 1907. After leaving Kansas, Dr. Schoenleber was engaged in a commercial enterprise in Denver.

Dr. Schoenleber joined the A. V. M. A. in 1892. He was a member of the Committee on Association of Faculties, 1909-10; member (1910-11) and chairman (1911-12) of the Committee

on Intelligence and Education, and a member of the Finance Committee (1915-16). At different times he held membership in the Kansas Veterinary Medical Association, Missouri Valley Veterinary Association, the Masonic order, Knights of Pythias and Odd Fellows. He was an honorary member of Alpha Psi Fraternity. His wife (née Lillian M. Miller), whom he married in 1892, died in Denver about five years ago. There were no children.

## ADOLPH J. PISTOR

Dr. Adolph J. Pistor, of Washington, D. C., died January 26, 1936, after an illness of a few weeks. The cause of death was pulmonary embolism following an operation. He had been chief

DR. A. J. PISTOR

of the Meat Inspection Division of the Bureau of Animal Industry, U. S. Department of Agriculture for a little over a year.

Born in Newark, N. J., July 7, 1876, Dr. Pistor attended local schools and was a graduate of the American Veterinary College, New York City, class of 1898. He took postgraduate work at the University of Dresden, Germany. After practicing for a short time, he entered the service of the Bureau and was assigned to meat inspection in Chicago. When the campaign to eradicate sheep scabies was started, about 1900, Dr. Pistor was transferred to Fremont, Neb. Later he participated in a similar campaign in Wyoming, which subsequently was enlarged to include cattle scabies.

In 1906, when the new meat inspection law went into effect, Dr. Pistor was ordered back to Chicago and again assigned to meat inspection, this time in the capacity of traveling inspector. Four years later, he was transferred to Washington, D. C., to assist in the revision of the meat inspection regulations. Shortly thereafter he was appointed an assistant to the Chief of the Meat Inspection Division, a post he continued to hold until about a year ago, when he was promoted to the position of Chief, succeeding Dr. R. P. Steddom, who retired from the service on December 31, 1934.

Dr. Pistor joined the A. V. M. A. in 1902. He was a member of the National Association of B. A. I. Veterinarians and the Twelfth International Veterinary Congress. He helped organize and was a director of the Beneficial and Relief Association of the Department of Agriculture.

## DANIEL A. PIATT

Dr. Daniel A. Piatt, of Birmingham, Ala., died at his home, January 19, 1936, following a heart attack.

Born in Lexington, Ky., October 28, 1868, Dr. Piatt attended local schools and the University of Kentucky. He then entered the Ontario Veterinary College and was graduated in 1891. Later he took a course at the Chicago Veterinary College and received a degree from that institution in 1898. He practiced in Lexington until 1908, when he removed to Birmingham, where he practiced until his death.

Dr. Piatt joined the A. V. M. A. in 1901 and served as Resident Secretary for Kentucky from 1902 to 1908, when he removed to Alabama. He was a member of the Birmingham Rotary Club, an elder of the Independent Presbyterian Church, and a member of the Birmingham Kennel Club. He is survived by his widow, two sons, two daughters, two brothers and four sisters.

K. U. J.

Our sympathy goes out to Dr. Samuel D. Buzzard, of Stewardson, Ill., in the death of his wife, January 18, 1936, as a result of complications following childbirth.

Fond Mother: "I hope my little darling has been as good as gold all day."

Nurse: "No, ma'am. He went off the gold standard about teatime."

# PERSONALS

## MARRIAGES

Dr. Everett O. Lummis (O. S. U. '25), of Fort Worth, Tex., to Miss Dorothy Thompson, of Quincy, Ill., at Quincy, January 3, 1936.

Dr. John H. Collins (O. S. U. '35) of Beltsville, Md., to Miss Mary Elizabeth Ward, of Worthington, Ohio, at Worthington, December 25, 1935.

Dr. L. B. Denton (Corn. '32), of Caribou, Me., to Miss Anna Howlett, of Andover, N. B., October 1, 1935.

## BIRTHS

To Dr. and Mrs. L. S. Leider, of Howard, S. Dak., a son, Mark, October 20, 1935.

To Dr. and Mrs. C. H. Milks, of Newark Valley, N. Y., a son, James Clifford, September 10, 1935.

## PERSONALS

Dr. E. W. Wilson (K. S. C. '31) recently located at Glover, Vt., for general practice.

Dr. W. G. Kinney (Mich. '25), of Seattle, Wash., has been confined to a hospital for over a year.

Dr. M. A. Taylor (Ind. '12) has removed from Mattoon, Ill., and is now practicing at Sullivan, Ill.

Dr. J. E. Greer (K. S. C. '25) is now located at Pulaski, Va., on Bang's disease eradication work.

Dr. E. C. Deubler (U. P. '11), of Newton, Pa., is a director of the Ayrshire Breeders' Association.

Dr. R. L. Booth (U. P. '35) is now associated with Dr. R. L. Humphrey (Ont. '05), at Middleburg, Va.

Dr. John D. Morton (Iowa '33) is now located at Dr. Reese Mitcham's Dog and Cat Hospital, Little Rock, Ark.

Dr. Cornelia Jaynes (Corn. '27), of Princeton, N. J., has been seriously ill for sometime with a spinal condition.

Dr. H. C. Gardiner (Chi. '04), of Anaconda, Mont., is a director of the American Hampshire Sheep Association.

Dr. H. M. Spangler (O. S. U. '35), of Kansas State College, visited his parents in Somerset, Ohio, Christmas week.

Dr. T. A. Sigler (Ind. '02), of Greencastle, Ind., has resigned as a member of the Indiana State Live Stock Sanitary Board.

Dr. George H. Carr (Colo. '18), of Brighton, Colo., is vice-president of the Adams County (Colo.) Holstein Breeders Association.

Dr. H. K. Bailey (Cin. '15), of Wilmington, Ohio, is a member of the Board of Directors of the Clinton County Agricultural Society.

DR. P. F. SCOTT (Ind. '18), of New Market, Ind., accepted an appointment in the U. S. Bureau of Animal Industry about the first of the year.

DR. J. ARTHUR GOODWIN (K. C. V. C. '06), of New Iberia, La., was a victim of the flu early in January and was laid up for three weeks.

LT. COL. JOHN H. GOULD (Iowa '02), V. C., U. S. A., retired, of Des Moines, Iowa, has been in the Army and Navy Hospital since October 8, 1935.

DR. GLEN L. DUNLAP (K. S. C. '28), formerly of Kansas State College, is now at the University of Idaho, Moscow, in the Department of Bacteriology.

DR. R. E. SHIGLEY (Chi. '09), secretary-treasurer of the North Dakota Veterinary Medical Examining Board, has removed from Kenmore to Minot, N. Dak.

DR. L. M. STECKEL (O. S. U. '07), of New York, N. Y., who has been on tour for over a year, is in Miami, Fla., for the winter, according to a recent letter.

DR. CLARENCE A. WOODHOUSE (O. S. U. '35), of Columbus, Ohio, is taking postgraduate work at Ohio State University. He is investigating special problems in parasitology.

DR. H. D. CHAMBERLAIN (Ont. '87), of Belvidere, Ill., was seriously injured when his car crashed into the end of a cement bridge on Route 76, the latter part of December.

DR. L. F. BARTHELME (Ont. '27), of Parsons, Kan., has accepted an appointment in the U. S. Bureau of Animal Industry and has been assigned to meat inspection in Chicago.

DR. L. B. DENTON (Corn. '32), of Caribou, Me., is stationed in Portland, Me., under temporary appointment in the U. S. Bureau of Animal Industry, on Bang's disease control work.

DR. CLIFFORD H. MILKS (Corn. '30), of Newark Valley, N. Y., recently moved into a new home. A hospital for small animals, attached to the home, is an important part of the new structure.

DR. ERNEST P. SPAETH (U. P. '98), of Gillette, Wyo., is a member of the executive committees of both the Wyoming Wool Growers Association and the Wyoming Stock Growers Association.

DR. M. D. DUCEY (Ont. '16), who has been assisting Dr. F. A. Burlingame (Ont. '14), of Chesaning, Mich., for the past year, has located in Midland, Mich., where he will practice on his own account.

DR. E. H. BARGER (K. S. C. '21), pathologist of the Illinois Department of Agriculture, stationed at the University of Illinois, Champaign, has resigned his position, effective February 1, and will return to California.

DR. LESTER C. FINLEY (Ind. '11), of Lapel, Ind., has been appointed a member of the Indiana State Live Stock Sanitary Board by Governor McNutt, to fill the vacancy created by the resignation of Dr. T. A. Sigler.

DR. CLARENCE W. SASS (McK. '20) has opened a modern veterinary hospital at 1525 Broadway, Toledo, Ohio, next door to the location where his father, Dr. Herman F. Sass (Gr. Rap. '02—McK. '09), started his professional career 48 years previously.

COLONEL J. R. SHAND (Chi. '07) has been retired from active service in the Veterinary Corps of the Army and, with Mrs. Shand, has taken a residence at Burlingame, Calif. Even though retired, Colonel Shand is continuing his membership in the A. V. M. A.